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ACUTE INTUSSUSCEPTION IN INFANCY AND CHILDHOOD

Report of Fifty-Eight Cases

F. H. MAGNEY, M.D., F.A.C.S.
Duluth, Minnesota

THIS study is based on the cases of acute intussusception coming to operation in St. Mary's and St. Luke's Hospitals during a period of twenty-five years, or from 1921 to 1945 inclusive. There were fifty-six patients who underwent fifty-eight operations. The condition recurred in two cases, necessitating a second operation. Both of these patients survived. The high mortality universally reported indicates that there is a field for further study in order that there be a more general early recognition of this condition, as well as a more early resort to surgery. Only by doing so can we reduce the mortality rate.

No attempt has been made here to determine the etiological factor in each case. Theoretically many factors may play a part, but Ladd and Gross in their series of 484 operated cases were able to determine the cause in only 5 per cent. Smith, in thirty-five cases including all ages, reported that the cause was found in seventeen. It must be noted that it is much easier to find the cause in an adult than in an infant or young child, as in the adult it is usually brought about by some mechanical abnormality or pathologic condition. In infants its occurrence is most prevalent between the ages of four and ten months, which is the time their diet is being shifted from a liquid to a solid one, so it is thought that this is an etiological factor. Its appearance is quite often during or shortly after a siege of acute enteritis. The disturbed intestinal peristalsis at this time may produce the mechanical inbalance that causes the bowel to invaginate. Meckel's diverticulum is accepted as a causative factor. This was found in two of the cases.

The youngest child in this series was seven and a half days old and the oldest twelve years. Seventy-four per cent were less than one year old, and the highest incidence came at six months. All but three were less than three years old. Sixty per cent were boys and 40 per cent girls, which is approximately the ratio found in other surveys. Ladd and Gross report 62 per cent males and 38 per cent females.

There are only three main or cardinal symptoms, and there being only three, every physician having to do with infants and children should keep these in mind. They are namely, intermittent colicky pain, vomiting and bloody stools. Seventy-three per cent of the children showed all of these symptoms, and all had at least one of them. If on examination an abdominal mass can be felt, the diagnosis is certain. If in addition to this, a mass is felt by a rectal examination, there should be no doubt that one is dealing with an intussusception. In 60 per cent an abdominal mass was felt, although only in 20 per cent was a mass felt rectally. The latter condition can be found only if the intussusception has advanced well down in the large bowel, which in most cases would indicate that the condition has existed for some time.

Even the early symptoms are severe enough to indicate that the child is seriously ill, and they should suggest the correct diagnosis. I am sure that many physicians have made the diagnosis by having the mother relate the child's actions over

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TABLE I. INCIDENCE OF INTUSSUSCEPTION ACCORDING TO AGE

Age	Cases
7 days	1
1 month	1
2 months	0
3 months	2
4 months	6
5 months	4
6 months	10
7 months	4
8 months	5
9 months	5
10 months	4
11 months	1
12 months	4
13 months	2
14 months	1
15 months	0
16 months	0
17 months	0
18 months	0
19 months	0
20 months	0
21 months	1
22 months	0
23 months	0
24 months	1
2 to 3 years	3
3 to 4 years	0
4 to 5 years	0
5 to 6 years	1
6 to 7 years	0
7 to 8 years	0
8 to 9 years	0
9 to 10 years	0
12 years	2

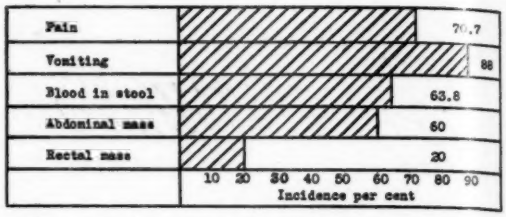

Fig. 1. The frequency of characteristic signs and symptoms of intussusception in infancy.

the telephone. In most cases the onset was sudden and consisted of colicky abdominal pain lasting only a few seconds and occurring every ten to thirty minutes. Usually the patient is so young that he cannot describe his pain but the parents will note that the child becomes intermittently pale, draws up its legs and cries out. It may utter a grunt during the paroxysms. It may appear well between these spells and even go back to its play. Vomiting is sometimes the first symptom and almost always an early one. As the intussusception progresses and the obstruction becomes more definite, there is pallor, sweating, dehydration, and later, shock. In this series, vomiting occurred in 88 per cent of the cases. Blood in the stool or on the examiner's finger was present in 63.3 per cent although it was noted that it was less likely to be present if the case was seen early. Ladd and Gross report blood passed by 85 per cent of their patients; Gibbs and Sutton report 70.9 per cent. According to our findings the mortality was 30.8 per cent when blood was present and 15.8 per cent when absent, or nearly twice as high in the presence of blood. This differs from the findings of Gibbs and Sutton who report a mortality of 22.5 per cent with melena and 42 per cent without.

Intussusception does not seem to appear especially in a child that is below par or with a history of nutritional disturbances, but rather in a healthy and well-nourished one. There may be one or two normal bowel movements followed in most instances by bloody mucus resembling current jelly. The pulse is usually rapid and there is evidence of pain the lower right quadrant. Even when in a state of shock, the child will thrash around, cry, and show other evidences of having pain. An elevation of temperature was observed in twenty-two cases or 38 per cent. It is sometimes difficult to palpate a mass in a well-nourished child even though a mass is present. It may be necessary to give a general anesthetic to relax the abdominal muscles. If this is done, the operation room should be set up so that the operation can be carried out under the same anesthesia. The mass is sausage shaped, but may be rather ill defined. If the invagination is small it may be located under the edge of the liver and be hard to palpate.

The intussusception may advance through the whole length of the large bowel and even protrude through the anus and look like prolapse of the rectum.

The laboratory findings were not of much value in this series, as the history and physical findings were so convincing in the majority of the cases that the laboratory was not called upon for assistance. This may have been a time-saving factor as the taking of laboratory specimens, their examination, and the interpretation would tend only to delay the operation. Three cases not reported in this series were supposed to have been reduced by enemas. The majority of the Duluth physicians are of the opinion that treatment is strictly surgical, and the so-called conservative methods were not attempted. No evidence was found in the records that the hydrostatic method of Hipsley was used. In the very few cases in which reduction was attempted by methods other than surgery, a barium enema was used under fluoroscopic observation. Surely no method of this nature should be used if the

TABLE II. OPERATIVE PROCEDURE USED AND ASSOCIATED MORTALITY

Operation	Number	Mortality Per Cent
Reduction:		
Reduction only	31	23
Fixation	5	00
Appendectomy	10	10
Fixation and appendectomy	3	00
Not reducible (tissues necrotic)	1	100
Not reducible (ileostomy tube)	1	100
Resection:		
Primary anastomosis	4	25
Double enterostomy	1	100
Single enterostomy	1	100
Not reduced-serus surfaces sutured at the beginning of intussusception	1	100

TABLE III. DURATION OF SYMPTOMS AND MORTALITY RATE

Duration of Symptoms	Number of Cases	Deaths	Mortality Rate (Percentage)
Less than 24 hours	28	5	18
24 to 48 hours	13	3	23
2 to 3 days	4	2	50
3 to 4 days	5	0	00
4 to 5 days	5	3	60
5 to 6 days	3	2	67

TABLE IV. TYPE OF LESIONS AND RELATIVE MORTALITY

Type	Number	Deaths	Per Cent Mortality
Ileo-ileal	5	2	40.0
Ileo-colic	49	12	24.7
Colo-colic	4	1	25.0

symptoms have been present for some time, as the series showed instances of gangrenous or near gangrenous bowel and in one case a gangrenous Meckel's diverticulum. The latter was resected and the patient recovered. Hipsley does not use his method if the symptoms have been present more than twelve hours.

If a pediatrician is not already in charge of the case or is in consultation, one should by all means be called without delay. There is no one more qualified by learning or experience to evaluate the child's condition and to treat the dehydration, acidosis, toxicity, and even shock, if present, by administering fluids and restoring the electrolytic balance. Blood and plasma may be needed. The dosage of the pre-operative medication should be left to the decision of the pediatrician. In this series, the mortality rate with a pediatrician in attendance was 23.5 per cent as compared with 29.1 per cent without.

Drop ether was the anesthetic of choice, which conforms to the experience of all other studies. Apparently it is safest and gives the best relaxation. All but five children were given ether. Three had local anesthesia plus ether. Two had local anesthesia plus gas and eight had a combination of gas plus vaporized ether.

Only operative cases in which the pathologic condition was verified are included in this study. Most operators used a right rectus incision, no doubt due to the fact that it gives the best exposure to the region of the ileocecal valve, where the most difficulty is encountered in reduction. The most favorable results are obtained if the duration of the symptoms is short, as the bowel is in better condition and the patient is in better condition to stand the operation. The average duration in this series was 34.4 hours. Ladd and Gross report thirty hours, Peterson and Carter thirty-two hours and Robbins forty-five hours.

Extreme care and gentleness must be used in handling the bowel, due to its friability. Several figures are passed into the left side of the abdomen to locate the head of the intussusception. It is pushed back along the colon. Good progress is usually made until reaching the neighborhood of the ileocecal valve. The bowel must then be brought outside of the abdomen. If there is much edema, this can be reduced by warm compresses. The reduction is continued by a gentle milking process, using the whole hand and squeezing the invagination out. It may be necessary to hold the bowel below between the forefinger and the thumb to steady it. The difficulty encountered near the valve is due to the edema of the gut and mesentery. Perseverance and a prolonged gentle pressure seems to reduce the edema, and in most cases where the situation seems most hopeless, success is achieved. At this point, caution must be exercised and traction avoided. Some operators advise the injection of some glycerin between the two serous layers due to its hydroscopic action on the edematous tissue. After the intussusception has been reduced, the bowl must be observed carefully for tears and viability. Small serous tears can be ignored, but if the tear extends into the muscularis it should be repaired. There is always edema, swelling, discoloration and some degree of hemorrhage, but if observed for a few minutes it will be found to improve in color, especially if a warm saline pack is applied. Immediately following reduction the appendix may appear to be acutely inflamed due

to edema, but most authors advise against its removal as it adds to the operative trauma and shock. However, in this series, there was only one death among the eleven who were submitted to an appendectomy. In thirty-one (55.2 per

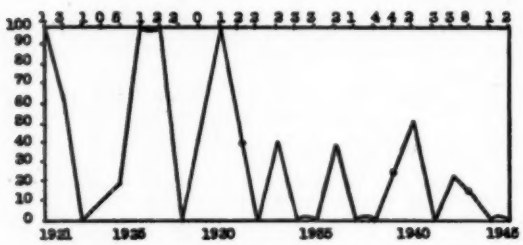

Fig. 2. The mortality rate by years, following fifty-eight operations for intussusception in infancy.

cent) of the cases the operative procedure was limited to the reduction of the intussusception, with eight deaths or a mortality of 28.8 per cent. In one case no attempt at reduction was made as the bowel was gangrenous. The patient died on the operating table. In five cases some method of fixation was done with the idea of prevention of recurrence with no deaths. In one case reduction plus appendectomy and fixation was done without mortality.

A resection of the bowl was done in seven cases, five of which had a primary anastomosis. There were two deaths, or a mortality of 40 per cent. One had a double enterostomy and one a single, following resection, both resulting in death. Both of these patients were in poor condition before the operation, so the outcome was anticipated. The mortality in all resection cases was 57 per cent which is considered very low. Most reports show a mortality rate of 70 to 100 per cent.

In one case where the reduction was found to be impossible, the serous surfaces were sutured at the beginning of the intussusception and an enterostomy tube inserted. The patient died. A gangrenous Meckel's diverticulum was resected in one case and the patient recovered. No attempt was made to fix the bowel by exteriorization of the appendix as reported by Masson and Judd. Most authors advise against any method of fixation as it only adds to the operative procedure without preventing recurrence. In some cases of recurrence, the invagination of the bowel occurs at a new site the second time.

While it is wise to limit the procedure to a simple reduction, even though it may tax the patience of the operator carrying it out, there are cases in which a resection must be done. In these cases a primary anastomosis was accompanied by the lowest mortality, probably due to the fact that the child cannot stand the loss of the succus entericus. Woodhall has reported the doing of a lateral anastomosis in the Mikulicz operation, thus establishing an immediate continuity of the bowel and preventing the loss of the enteric contents. No such procedure was attempted in this series.

The fifty-eight operations were followed by fifteen deaths, or an overall mortality rate of 25.9 per cent. It is interesting to note the great improvement that has been made in the management of these cases during the last fifteen years.

TABLE V. MORTALITY RATES REPORTED BY DIFFERENT AUTHORS

Author	Per Cent Mortality
Gribsby and Kaplan	20.0
Gordon	22.7
Mayo and Woodruff	23.6
Duluth	25.9
Gibbs and Sutton	30.4
Ladd and Gross	31.2

The first ten years showed a mortality of 46.7 per cent as compared with 18.1 per cent during the last fifteen years. In the last five years seventeen cases were operated upon with only two deaths, or a mortality of only 11.8 per cent.

Gibbs and Sutton report a mortality rate of 30.4 per cent over a sixteen-year period, Ladd and Gross 31.2 per cent, Grigsby and Kaplan 22.0 per cent, Gordon 22.7 per cent and Mayo and Woodruff 23.6 per cent.

The improvement in the results during the more recent years is due to many factors. The early diagnosis and surgery without delay are without doubt of most importance. The improvement in surgical technique plays a great part. The part played by the pediatrician in preparing the patient for operation and caring for him postoperatively is so important that every case should have the benefit of this co-operation. The more recent adjuncts to surgery, such as whole blood, blood plasma, the Wangensteen decompression tube, et cetera, are vital in bringing down the death rate in intussusception.

(Continued on Page 302)

FINANCING THE ESTABLISHMENT OF A SMALL HOSPITAL

JAMES. A. HAMILTON
Hospital Consultant and Professor of Hospital Administration, University of Minnesota
Minneapolis, Minnesota

OUR discussion is concerned with the establishment of a small hospital, about 50 to 100 beds, in a rural area. It is true many of the principles likewise apply to a hospital of larger size located in an urban center. Recent studies of population indicate that approximately 45 per cent of hospitals in the United States are classified as rural. However, a sizable portion of the rural population is located in areas surrounding urban centers and is not occupied with farming activities. Likewise, the studies are indicating that the rural population would utilize hospital service to the same degree as the urban resident if more facilities were readily available and the cost of such service could be properly financed. Undoubtedly, much of the hospital construction in the next few years will occur in the rural areas.

Launching the Project

For the purpose of this discussion we will assume that there has been sufficient interest in the local community to have resulted in the formation of a small committee requested by the citizens to investigate the possibility of creating a small hospital.

The first step would be to have a survey of the population, health, social and economic characteristics of the area to determine whether there should be a hospital and, if so, what should be the extent of its functions, how large should it be, what facilities are needed to perform the functions as determined, and finally, how can it be integrated with the other hospital facilities of the state program.

A statement of such facts, together with their interpretation on the light of hospital trends, and some analyses of the probability of continued operating support, constitute a real necessity for the launching of a successful project. It tends to keep the local enthusiasm intelligent and within rational bounds. Also, it tends to balance the pressure of local pride with realistic endeavor. If money must be raised for the construction of such an institution, the donors ask very significant questions which cannot be answered without the above data, and such donors usually desire an outside reliable opinion. Therefore, not only is it advisable for intelligent planning, but it also may be considered to be good business in terms of the success of the project.

Such a survey could be conducted by a nearby hospital administrator or a person devoting full time to such consulting services. The nearby administrator usually has the disadvantage of local prejudice, and his recommendations are not so easily accepted, even though he may be a very capable person. The expert consultant who has the benefit of objective distance, also can bring to bear the experiences and conclusions which other communities have experienced outside of the local area. It must not be assumed that such a consultant would always recommend in favor of the construction of a hospital. In fact, I am just completing a survey where we are recommending that no additional facilities be constructed.

The cost of such a survey, including professional fees, will naturally vary with the size of the area, the complexity of the local problem, and the availability of facts. Therefore it may run from $1,000 to $3,000 for a relatively small community. The funds for this purpose can be secured from a local organization such as a lodge, legion, or Rotary Club; from a single individual in the community vitally interested in health affairs, or from local government public funds. The securing of such funds has the additional advantage of giving to the community the first real evidence that the interest for a hospital is deep-rooted—a very necessary fact for the future success of the project.

The next step usually is the formalizing of an organization to serve as trustee in receiving funds and carrying out the objectives. In most cases this is of nonprofit character, and it is well to secure a local lawyer to give advice in the formation of this unit, in order to take advantage of existing state laws which will give freedom from taxation and other privileges. The cost of such assistance is very low. Likewise, it is im-

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portant to secure some hospital advice as to the best forms of by-laws for the operation of such an institution. Here the American Hospital Association has several suggestions, and again the consultant can be helpful in interpreting these in the light of the local conditions.

The third step in launching the project is the raising of capital funds. The amount necessary will be estimated by the consultant in co-operation with an architect. In these days of high construction costs, it is advisable not to conceive of less than $10,000 per bed. In some rare instances it is possible to do this at the present time for $8,000 per bed. In a few situations the cost may even be higher. Such amounts will construct and completely equip the hospital. Included is an architect's fee which usually amounts to between 6 and 7 per cent of the total construction and fixed equipment cost, and a hospital consultant's fee which ranges from 2 down to 1 per cent depending upon the size of the project.

The capital fund campaign usually includes three phases:

1. A public relations phase which involves the telling to the right people the facts relating to the need and the objectives of the proposed hospital.

2. The securing of promised contributions from a selected group of individuals with means, and from corporations located in the area who will be benefited by the new hospital.

3. The conduct of a general campaign in which everyone in the area may have some opportunity of contributing. Normally the larger portion of the funds comes from large givers in corporations. The general campaign usually yields a very small portion of the total amount.

Many communities have found it worth while to employ outside fund-raising experts. There are several very reliable firms who conduct such campaigns with excellent results. They do not raise the money, but assist the local people in doing so. Many of the theoretical objections to the use of such outside units are so much bugaboo and are unrealistic. They do not use high pressure; they have the benefit of the experiences of many communities; they do guide the local effort and keep it continuously in line with the necessity of activity which is not usually possible through normal voluntary effort. They are trained in developing successful techniques. They usually work on a fixed fee basis, which together with the total costs amounts to about 2 to 3 per cent of the total amount raised. They do not undertake a project unless there is reasonable assurance it will be successful. Most communities feel that "now is not the best time" to raise money, whatever time that may be. If one follows that philosophy, no money would ever be raised for welfare projects. Therefore, this barrier should be overcome from the very beginning.

A considerable portion of funds for recent hospital construction is contributed by corporations. Contrary to the general belief, most corporations in rural areas are not soulless, but reflect the attitude and humanitarian instincts of the human beings who direct them. I could give you many illustrations of corporations who have responded enthusiastically and generously to such hospital effort.

If desirable, it is possible to raise some of these capital funds from tax sources—not only from local, county, and state sources, but from Federal funds available under the new Hill-Burton Act, with which I believe you are acquainted. It is possible to secure about a third of the capital from the funds available under the new Hill-Burton Act. However, it is necessary that the local project be integrated into a state program and that the state authority indicate its approval and priority status.

Construction of the Hospital

This is a period of high construction costs. With the uncertainty of labor costs, contractors are padding their bids. Even then it is advisable to leave additional allowances for a possible rise in cost during the construction period. It is the hope that even though labor rates will not be reduced, that the productivity of labor will be increased. It is also hoped that labor's demands will be stabilized, thus making it possible for the contractors to remove the additional padding. No guess is reliable as to when this will take place.

Also, it is difficult in these days to secure suitable materials with sufficient regularity to produce the kind of hospital one desires. It is hoped, with the removal of priorities and the increased productivity of labor, that materials will be available within a reasonable length of time.

In the meantime, many communities are making specific architectural plans for the development of their hospitals. It is well that a relatively long time be available for such procedure

in order that ideas may mature, and that with new thinking, the plans can be revamped as many times as necessary until finally satisfactory. It is advisable to hold in mind that the unit is to be used over a long span of years and that errors in the planning will have a serious effect upon later operation.

Most communities, therefore, are employing not only an architect, but a hospital consultant, and it is my belief that both are necessary to give an economic result. No architect, whether he has done several hospitals or not, is in a full position to keep abreast with changes in hospital operation which may effect a big saving in later operating costs. The qualified hospital consultant is in the best position to reflect such results in the architect's plan.

Operating Funds

In the planning of a new hospital, it is very advisable to plan for the financial operation of the institution in advance of its construction. The most potent influence on the net financial result will be the percentage of occupancy of the proposed institution. Studies have indicated that the smaller the hospital, the lower the percentage of occupancy, which is usually the result of the increased proportion of segregation of patients which is imposed upon the smaller units. Therefore, it is very favorable in the planning of the hospital itself to assure as much flexibility in bed utilization as possible, thus insuring as high a percentage of occupancy and income as can be realized.

Current operating capital should be anticipated to carry the loss of operation for at least six months and perhaps better, for a year. In addition it will be necessary to have some funds for current operating purposes. Therefore it is exceedingly advisable that a budget be prepared in advance. Here again the consultant with his knowledge of hospital operation is in the best position, not only to advise the new Board of Trustees in the operating organization of the hospital, but also to aid in the preparation of the budget.

Normally, it is not possible for the hospital which desires to give some free service to the community to secure its complete income from patients solely. There is an increasing tendency for third parties to pay for patients' bills. In many institutions this is as much as two-thirds of their total load. Such third parties may take the form of the voluntary Blue Cross movement, commercial insurance, and local government authorities. Therefore great care should be taken in making financial arrangements with these third parties which will yield a sufficient income to operate the institution. All of these endeavors are possible in the small community as well as the large. Normally, a hospital of the size we are discussing has as a cost of service about $8 per patient per day. With increased labor costs, the chances are that this amount will increase, and within a relatively short time will amount to $10 per patient per day.

Usually it is necessary for the community hospital to secure some outside financial assistance in its operation. If it is possible to secure endowment funds at the same time as one is raising construction funds, such a situation is ideal. However, this is very rarely possible. Therefore, the raising of operating funds usually takes place after the construction of the institution. For the first few years of its existence, the hospital may secure some of these funds from local governmental sources in the form of an annual subsidy in order that the institution may exist at all. Likewise a local annual drive for the operating contributions may be conducted. Many hospitals have existed on these two sources alone for many years before they were able to secure bequests for endowment purposes.

Summary

The successful establishment of a new hospital must depend upon the possibility of giving good service to the community, primarily through developing a good professional staff, and upon sound planning. If this is done, usually the financial needs are met, provided the facts are properly interpreted to the community as a whole.

To accomplish such results, however, the local people should proceed slowly, and with the advice and guidance of persons experienced in the hospital field.

I am informed by leaders in the rural areas in this country that many communities realize the need for hospital facilities and are prepared to put forth the effort and the sacrifices necessary to secure such community service. Therefore, I have every confidence that the majority will proceed along intelligent lines and that the rural population will eventually have available those hospital services vitally necessary to their full life.

A SHORT COMMENTARY ON THE HISTORY OF THE CIRCULATION

Modern Addenda

F. A. WILLIUS, M.D.
Rochester, Minnesota

THE casual student of medical history associates two famous and well-known historic names with the discovery of the circulation of the blood. He knows that the martyr, Michael Servetus, generally has been regarded as the discoverer of the pulmonary circulation and that William Harvey conceived and described both the systemic and pulmonary circulation, suggested the existence of the capillary circulation and described the essential functions of the heart. Most physicians today consider that Harvey discovered the circulation. I have no intention to deprecate the monumental contribution of Harvey but rather to maintain the accuracy of historical documentation.

In order to do this it is necessary to present the facts as they are inscribed in the records of the past and to supplement the older records with more recent biographic research. In such reexamination of historical data several less prominently mentioned contributors are brought to attention, and particularly one who was introduced to readers only eleven years ago. In presenting this commentary it is not my intention to become involved in the futile controversy relative to priority which is currently being carried on among various medical historians. It is, however, my desire to present certain evidence to the reader which may enable him to conclude that the current concepts regarding the circulation are the product of several noteworthy historic personages living in different eras and in different localities.

According to recent disclosures, the first recorded concept of the pulmonary circulation was that of a famous Arabian physician, Ibn an-Nafis (circa 1210-1288 A. D.). The important information which he contributed became available largely through the recent researches of Meyerhof and of Haddad and Khairallah. Meyerhof learned that a young Egyptian physician, Muhyi ad-Din at-Tatawi presented a thesis on Ibn an-Nafis for his doctorate degree before the Medical Faculty of Freiburg in 1924. This thesis was not published and, in all probability would have remained in obscurity had it not been for the interest and continued investigations of the three aforementioned medical historians.

Ibn an-Nafis will be discussed more fully than the other contributors owing to the relatively recent appearance of information concerning him in historical writings even though he is the most ancient of all. He was reared in Damascus but no information is available regarding his parents, his childhood or his early education. Ibn an-Nafis studied the medical sciences under the brilliant teacher and scholar, Muhadhdib ad-Din 'Abd ar-Rahim ibn 'Ali.

Ibn an-Nafis was said to have been a tall man of slender stature, dignified, polite, austere and refined. The biographies of this man, according to Meyerhof, indicate that he was a master of the art of healing and that he had no peer in the acuity of his investigations. He remained unmarried and devoted most of his time to study and writing. Ibn an-Nafis was a prolific writer and did not confine his writing to medical subjects but also wrote extensively on logic, philosophy, theology, jurisprudence, applied law, the Arabic language, tradition and rhetoric.

As was the custom of the day, Ibn an-Nafis wrote numerous commentaries on the works of others but, in addition, wrote three books on medicine. "Kitab ash-Shamil fi't-Tibb" (The comprehensive book on medicine) was an extensive encyclopedia which was never completed and no copy of this work is known to exist today. Another work, "Kitab al-Muhadhdhab fi'l-Kuhl" (The well-arranged book on ophthalmology), is also nonexistent but references to it were found in later works on the subject. The third book, "Kitab al Mukhtar min al-Aghdhiya" (The choice of aliments) was said to be of relatively little importance. A manuscript of this work was known at one time to be in the Berlin State Library.

Ibn an-Nafis' most important work was his commentary on Avicenna's (Ibn Sina; 980-1037) "Sharh Tashrih al-Qanun li-'bn Sina" (Anatomy) because this document contained the first known description of the pulmonary circulation. The exact time of its inscription is not known but Meyerhof believes it to have been about the

From the Section on Cardiology, Mayo Clinic, Rochester, Minnesota.

middle of the thirteenth century. At least four manuscripts of this voluminous work have been preserved. Ibn an-Nafis' manuscript, therefore, antedates Servetus' work by approximately three centuries.

Ibn an-Nafis' conclusions regarding the pulmonary circulation were based on indirect observation, speculation and remarkably correct deduction. In the preface of the commentary he stated that the prevailing religious laws and his own innate charity had prevented him from performing anatomic dissections and therefore, he was obliged to study the forms of anatomic structures from the works of others, especially those of Galen. Galen's concepts regarding the heart and circulation were fallacious but were generally accepted as being true for nearly fourteen and a half centuries.

It is most plausible, as contended by Temkin, that Servetus' conclusions regarding the pulmonary circulation were original, for it would have been an unusual coincidence for him to have known of this earlier work. The separation in the space of time by nearly three centuries, the widely separated geographic localities and the great differences in language, strongly support the contention that Servetus was entirely unaware of Ibn an-Nafis' contribution.

Ibn an-Nafis described the pulmonary circulation five times in his "Commentary" and discussed the general physiologic principles of respiration. Man was classified as an air-breathing creature in whose lungs the blood was aerated. He mentioned the alveoli of the lungs which were first actually demonstrated by Marcello Malpighi in 1660.

The following quotations from Ibn an-Nafis' work in translation from Meyerhof's article are of importance: "Therefore, *the blood,* after having been refined, *must arise in the arterious vein to the lung in order to expand in its volume and to be mixed with air* so that its finest part may be clarified *and may reach the venous artery in which it is transmitted to the left cavity of the heart.*" Disclaiming Galen's false concept regarding the existence of invisible pores in the ventricular septum, Ibn an-Nafis stated: *"But there is no passage between these two cavities;* for the substance of the heart is solid in this region and has neither a visible passage, as was thought by some persons, nor an invisible one which could have permitted the transmission of blood, as was alleged by Galen." Ibn an-Nafis also stated that the heart was nourished by its own vessels and in this statement at least implied a very early concept of the coronary system.

Ibn an-Nafis' important contribution was, beyond dispute, the one outstanding highlight in the medical accomplishments of the Medieval Era and, owing to its relatively recent disclosure, merits emphasis in historical documentation dealing with the circulation.

The life of Michael Servetus (1509-1553) of Villanueva de Sigena, Spain, has received considerable historical comment and therefore a full account of his tragic existence and death would entail much repetition.[4,9] He was a self-styled theologian, in addition to being a physician, an author, a linguist and a translator, and his religious rebellion found expression during the troubled years of the Reformation.

Servetus was judged to be a heretic by many of his contemporaries and he acquired more enemies than friends. The accusations of heresy were based on the confused and bigoted religious doctrines of his day and his ideas concerning religion certainly would not be considered heretic according to modern, or even semi-modern, religious standards. Nevertheless he was convicted of heresy at the insistence of Calvin after an unfair trial, met his death on the pyre after having experienced many humiliations and cruel suffering and became one of medicine's first and most prominent martyrs.

The description of the pulmonary circulation by Servetus was embodied in his famous, controversial, religious work "Christianismi Restitutio" which generally was presumed to have appeared first in 1553. However, Mackall found evidence that this work was written and in circulation by 1546. The "Restitutio" in essence was a disquisition of Servetus' religious philosophy and an outspoken criticism of prevailing theologic views. His description of the pulmonary circulation was used only to illustrate and emphasize a point in discussing the nature of the Holy Spirit. Servetus described the circulation of the blood from the right chambers of the heart through the vessels of the lungs where it was mixed with the air and thence back to the left chambers of the heart. This was his only important medical contribution.

Thus, two entirely unrelated discoveries dealing with the basic and correct concept of the pul-

monary circulation are now known to exist in early medical annals. The first occurred approximately in the middle of the thirteenth century and the second, approximately three centuries later. Each contribution, without a doubt was original and Ibn an-Nafis' discovery in no measure detracted from the importance of Servetus' later work.

An Italian anatomist of the Renaissance who described the pulmonary circulation almost correctly deserves mention. He was Matteo Realdo Colombo (Columbus; 1516?-1559) of Cremona, who became Vesalius' (1514-1564) successor at Padua.[2,3] In his work, "De re anatomica," published in 1559, Colombo described the pulmonary circulation but did not explain the details correctly because he accepted certain beliefs of the ancients. He held the view that the veins carried the nutritive blood throughout the body and he also perpetuated Galen's fallacious idea that the liver was the central organ of the cardiovascular system.

By means of vivisection, Colombo demonstrated that the pulmonary veins contain blood but held the erroneous belief that the blood becomes cooled during the process of respiration. He, however, disagreed with Galen regarding the mythical notion that the ventricular septum contains invisible pores and in discarding this belief, Colombo was enabled to understand the general scheme of the pulmonary circulation.

Colombo's work appeared six years after the death of Servetus and some historians are of the belief that Colombo plagiarized the work of the martyr. Colombo was also accused of plagiarizing Vesalius' "De fabrica humani corporis," which was published in 1543. He imitated the title page of Vesalius' work and utilized so many other characteristics of "De fabrica" that from the records of history it has been impossible to clear these suspicions.

Still another important contributor to the discovery of the circulation was the celebrated Italian anatomist, Andrea Cesalpino (1519 or 1524-1603), professor of medicine at Pisa and physician to Pope Clement VIII. Cesalpino's first published work which contained a description of the circulation appeared in the volume "Peripateticarum quaestionum Libri V," which also contained discussions of a philosophic nature. It was published in Venice in 1571 and again in 1593. It is stated, however, that Cesalpino used the term "circulation" in its physiologic sense as early as 1559. Thus, his first publication with reference to the circulation of the blood preceded Harvey's work by fifty-seven years.

For many years a bitter controversy has been waged among medical historians regarding Cesalpino's priority and his rightful place among the discoverers of the circulation. The Italian historians have been particularly irate, not without considerable justification. It is not my desire to enter this controversy but rather to present historical evidence which supports the Italian side of the argument. In a recent interesting and important monograph, Arcieri, who asserts that he has read and studied all the Cesalpinian works carefully, brings forth convincing evidence that Cesalpino had comprehensive knowledge of the circulation. The records of history undisputedly prove the priority of the publication. Corwin, in a relatively recent publication, also emphasizes the importance of Cesalpino's work.

It is important that the following evidence clearly presented by Arcieri be examined carefully. Cesalpino observed the difference in both the structure and the function of the pulmonary artery and vein. His observations also contained a description of the origin, course and size of the aorta and vena cava and the recognition of a difference in the structure of arteries and veins in general. Cesalpino explained that communications exist between the portal veins and the vena cava, he observed the reciprocal relation of cardiac contraction and vascular dilatation, and predicted that an anastomosis (capillaries) exists between arteries and veins. When these various observations made by Cesalpino and his use of the term "circulation" are considered it would be strange if this learned physician had not himself integrated these various observations and understood at least the general scheme of the circulation of the blood.

In 1628, William Harvey (1578-1657) of Folkestone and London, published his famous "Exercitatio anatomica de motu cordis et sanguinis in animalibus.[11,12]" Notes made by Harvey as early as 1616 which are in the possession of the British Museum indicate that even at that time he possessed a clear understanding of the structure and function of the heart and circulation.

It is not known whether Harvey knew of Cesalpino's work. Cesalpino is not mentioned in

Harvey's disquisition while frequent reference is made to Galen, Aristotle, Fabricius and others. Harvey studied at Padua from 1600 to 1605 and during the first three years Cesalpino was still alive. Harvey studied anatomy under the celebrated Hieronymous Fabricius of Aquapendente and it would seem strange if this learned teacher was not acquainted with the writings of a native contemporary in his own field. If Fabricius knew of Cesalpino's work it would seem stranger yet if he had not imparted this knowledge to his students. The problem of language was no barrier to Harvey because he was unusually proficient in the knowledge and use of Latin and his monumental work appeared in faultless Latin. The important question of whether Harvey knew of Cesalpino's work may always remain unanswered.

Harvey's work was not accepted universally by his contemporaries so it is little wonder that the earlier contributions of others failed to either interest or instruct the medical profession of his time. Such celebrated contemporaries as Riolanus, Gassendi and Wormius refused to accept Harvey's clear exposition which was based on dissections, vivisections, observations and lucid reasoning. As already emphasized, the fallacious teachings of Galen endured for nearly fourteen and a half centuries and so deeply were they impressed on physicians that unprejudiced, clear vision regarding the new and correct ideas seemed impossible. Riolanus is credited with the statement that if dissections and observations disagreed with those of the great Galen, then any discrepancies should be attributed to the fact that nature had changed since the day of the great master.

At this point of this commentary it is appropriate to reiterate the generally accepted concepts regarding the heart and circulation which prevailed at the time of Harvey. Earlier physicians accepted the belief that a movement of the blood occurred but, like Galen, they believed that this movement took place in the veins by a process of ebb and flow. Some still held the view that arteries contained air (spirits) while only the veins contained blood. Circulation of the blood had not been universally understood, although as previously pointed out, the general scheme of the circulation was certainly known by Cesalpino. The liver, rather than the heart, was considered to be the central organ of the cardiovascular system, and it was in the liver that the production of blood was said to occur. The prevailing idea was that two kinds of blood were present; one kind flowed from the liver to the right chambers of the heart and to the lungs and then returned to all parts of the body by the veins; the other kind flowed from the left chambers of the heart to the various parts of the body by means of the arteries. One of the crucial fallacies of Galen's beliefs was that invisible pores existed in the septum of the ventricles. Hence, a small amount of blood from the right ventricle was permitted to trickle through to the left ventricle. No definite knowledge of the heart as a propulsive organ designed for the conveyance of blood from the heart and ultimately back to the heart was extant. It was even debated whether the heart is muscular and it was not until 1664 that Niels Stensen (Nicholas Steno; 1638 to 1686), definitely proved that it is. The early physicians considered the pulsations of the heart and arteries to be the result of the alternate contraction and expansion of the air (spirits).

Harvey's exposition was clear, convincing and based on actual proof and offered an intelligible explanation for those who were willing to accept new ideas. His proof was perfect and his disquisition appeared in an era of greater medical enlightenment so that its universal acceptance was only a matter of time. These have been the factors which have stamped this great Englishman as the discoverer of the circulation.

Harvey proved that contraction, not dilatation, of the heart is synchronous with the pulse, that contraction of the ventricles squeezes out the blood and propels it into the aorta and pulmonary artery, that the expansion phase of the pulse is produced when the arteries become filled with blood, that no invisible pores exist in the septum of the ventricles (also proved by several predecessors) and that the only means whereby blood from the right chambers of the heart can reach the left chambers is through the pulmonary circulation. Harvey completed his description of the circulation of the blood when he stated that blood from the left side of the heart is conveyed by the arteries, reaches the veins by small communicating vessels (capillaries) and is then returned to the heart. He could not visualize the small communicating vessels but he postulated

(Continued on Page 285)

DUODENAL DIVERTICULUM

ARTHUR N. COLLINS, M.D., F.A.C.S.
Duluth, Minnesota

IN an effort to emphasize the importance of duodenal diverticulum, the writer has undertaken to report a case of his own, to review similar cases from the records of local hospitals, and to call attention to the symptomatology and surgical treatment.

In 1710, Chomel first described duodenal diverticulum in a woman dead from apoplexy. The diverticulum contained twenty-two gallstones. Case described it first from the x-ray standpoint in 1913, while Forsell and Kay described the first surgical treatment for it in 1915.

Incidence

In one of our x-ray departments in Duluth, duodenal diverticulum was noted forty times in 1,744 gastrointestinal studies (2.3 per cent). At Stanford University Hospital, during 6,000 gastrointestinal roentgen examinations, it was noted seventy times (1.16 per cent). This is not common, to be sure, but at the same time is not a rarity.

The roentgenologist during gastrointestinal studies not infrequently observes and makes notes of duodenal diverticulum but more often coincidently with other intra-abdominal findings, such as gall-bladder abnormalities, peptic ulcer, carcinoma or other epigastric disorders. Occasionally, duodenal diverticulum stands alone as the single finding to account for the patient's symptom-complex.

Its clinical importance is perhaps not sufficiently recognized. Undoubtedly, many diverticula exist without causing symptoms. Many, unsuspected before death, have been found at autopsy. A diverticulum, small to begin with, probably does not cause symptoms until it attains a size sufficient to develop retention within or mechanical pressure to adjacent structures without.

What relationship, then, has a duodenal diverticulum to the symptoms of the patient? What should be done if it is decided a relationship exists between the lesion and the complaint? The question of its clinical significance has formed the basis of much discussion during the last decade. Groups of cases are being reviewed in the literature, and experiences compared, in a constructive effort to command more exactness. No doubt operations have been done for gall-bladder disease or ulcer when, in essence, a missed diverticulum was at the root of the patient's trouble. Beals, in a study of forty-one cases of duodenal diverticulum seen in his x-ray work, found that about 36 per cent had received surgical treatment for gall-bladder disease or had x-ray evidence thereof.

Diagnosis begins with a careful review of the patient's history, his complaints and the length of time involved. The following case is presented.

Case Report

A man, aged fifty-seven, a construction worker, presented himself complaining that for the past two years he had had epigastric distress after eating, which had been gradually becoming worse. It seemed to him to be gas pressure, for he obtained some relief by belching. Some foods distressed him more than others. Onions, potato chips, cabbage or fried foods were the worst offenders. The distress seemed worse at night. No relief was obtained by taking milk or alkalis, and he found no food which relieved the burning and boring pain. He had experienced no hematemesis or bloody stools. He had lost about ten pounds in weight in the preceding eight months.

On examination he was found to be a man of strong muscular build. Heart and lungs were essentially normal. The blood pressure was 120/80 and his pulse was 68. No tenderness was elicited over the epigastrium or elsewhere in the abdomen, and no mass was palpated. There was a small reducible left inguinal hernia. The extremities were not abnormal. Laboratory findings included essentially normal urine, a hemoglobin value of 89 per cent, erythrocytes numbering 4,640,000, and a white blood cell count of 7,850.

The x-ray studies of the gall bladder and gastrointestinal tract revealed (Fig. 1) "a poorly functioning gall bladder, no evidence of stones, and a negative stomach and duodenal cap. A diverticulum of the second portion of the duodenum was demonstrated, which had an area of decreasing density due either to retained food from a previous meal or to a polypoid growth within the diverticulum. It should be kept under observation, especially if there is blood in the stool, and the advisability of surgery should also be considered in view of these findings. A single film of the abdomen, forty-eight hours after ingestion of the barium meal, shows no evidence of any barium remaining in the diverticulum. Most of the barium has been expelled."

Presented before the Duluth Surgical Society December 26, 1946.

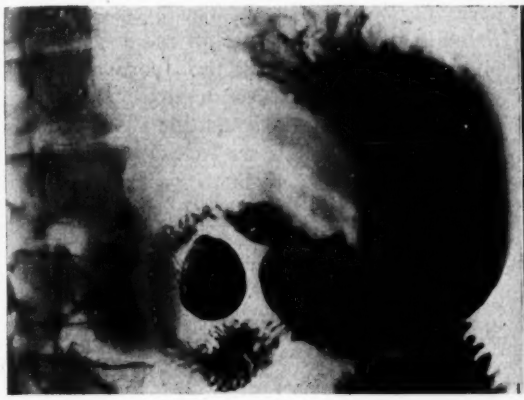

Fig. 1. The x-ray shows a normal stomach and duodenal cap with a large diverticulum of the second portion of the duodenum.

Fig. 2. This x-ray, taken six months after the removal of the duodenal diverticulum, shows a normal appearing duodenum.

In the absence of positive diagnostic findings to account for the man's persistent complaints, aside from the diverticulum, exploration was advised. At the operation, there was found a soft gall bladder and no palpable lesion of the stomach. After considerable search in the second portion of the duodenum, the sac of the diverticulum was found posteriorly. It was rotated anteriorly, clamped at its neck, and removed with a cautery. The stump was sutured and then overcast with interrupted silk sutures.

Postoperatively, a naso-gastric tube was used for decompression of the stomach. A transfusion of 500 c.c. of whole blood was given, supplemented by saline with glucose or by distilled water with glucose. On the fourth day the naso-gastric tube was discontinued, and water in small amounts was allowed by mouth.

The laboratory reported the diverticulum to be lined with normal mucosa without significant inflammatory change.

The man took a vacation and at the end of eight weeks returned to his regular duties. He has worked steadily up to the present time, about six months after the operation. He feels fine, has no pain, and his old trouble has ceased. He is on an unrestricted diet without discomfort. He has gained 20 pounds in weight. An x-ray check-up and report six months after operation was as follows (Fig. 2): "Films of the stomach following the ingestion of the barium meal show the stomach and duodenal cap to be within normal limits. The large diverticulum of the second portion of the duodenum has been resected and the duodenum appears to function normally."

Review of Cases

If it is true, as has been stated, that diverticulosis is noted on roentgen examination with relative frequency, we are faced then with the problem of sorting out and fixing our attention upon those cases in which a duodenal diverticulum is accountable for symptoms disabling to the patient. These diverticula are not all harmless by any means. Malignancy, ulceration, and perforation of a diverticulum have been found to be serious complicating factors. A case of spontaneous rupture of a duodenal diverticulum was described by Beaver in 1938, and similar episodes were described by Boland and Monsurrat. Gallstones have been found within a diverticulum. Hare and Cattell discuss the subject of duodenal diverticulum simulating gall-bladder colic. Sinister factors, therefore, are sometimes linked with this condition, and a differentiation is called for.

Twenty-three cases of duodenal diverticulum have been collected from the records of St. Luke's and St. Mary's hospitals in Duluth, and these involved thirteen males and ten females. There was one child, three years of age, who on x-ray examination showed a diverticulum of the second portion of the duodenum. The rest of the patients ranged in age from thirty-seven to eighty-eight years. Twenty of the twenty-three patients were fifty years of age or older. Ten were over sixty years of age. The overwhelming majority were in the older age group.

Nineteen of the twenty-three patients complained of epigastric pain. Of the remaining four, one patient, aged fifty-one, had aching pain in the left chest and left upper quadrant, worse after eating, with a history extending back fifteen years. The x-ray study was not typical of ulcer, and the patient was not treated surgically.

One patient, aged seventy, had sharp pain in

the upper right quadrant, and the history extended back many years, with nausea and vomiting and diarrhea by spells, and with weight loss. X-ray examination showed a duodenal diverticulum in the second portion. The patient was not treated surgically.

One patient, aged seventy-eight, had constant severe pain in the umbilical region for a period of one month, with tenderness, vomiting and loss of weight. X-ray showed a duodenal diverticulum in the first portion. No operation was performed. At autopsy, cholelithiasis and carcinoma of the pancreas were found.

The fourth case without epigastric pain was that of the child referred to above.

As to the nature of the pain, three patients complained of burning pain, three of cramp-like pain, three of sharp pain, and seven of dull aching discomfort. Gas was mentioned as distressing in nine cases, and bloating or fullness in six cases. In eleven cases, the history extended back one year or more. In nine cases, the history extended back "for years." One patient, a man, seventy-two years of age, had attacks for thirty-five years of epigastric burning pain and, at times, nausea, vomiting and constipation, but no local tenderness. On x-ray examination a large duodenal diverticulum was visualized, and six-hour retention was observed in the diverticulum. No operation was done. This was the longest history in the group.

Fifteen of the twenty-three patients had tenderness in the epigastrium. One of the fifteen, a man aged sixty-seven, stated the right upper quadrant was the site of his tenderness. He was an obese miner who was admitted for cardiovascular disease, but who on gastrointestinal study showed a duodenal diverticulum. On the other hand, one man of sixty, had no complaint of tenderness but had epigastric distress. His x-ray study revealed a normal gall bladder and a diverticulum in the second portion of the duodenum with six-hour retention. He stated that Sal Hepatica made his pain worse. No operation was done.

Nausea was listed in the group ten times, and vomiting eleven times. Five of the eleven had intercurrent conditions, such as gallstones, ulcer, or carcinoma, as complications.

The diverticulum was localized by x-ray in the first portion of the duodenum in two instances. One of these two patients also had a carcinoma of the pancreas, and the other had had multiple operations on the stomach. The diverticulum was found in the second portion of the duodenum in nineteen cases. When the third portion was involved, the diverticula were multiple. There were three of these, one in a diabetic with cirrhosis and cardiovascular disease, one associated with an inoperable carcinoma of the pancreas, and one with diverticula also in the second portion. In five cases, cholelithiasis was a complicating factor found either at operation or on x-ray report.

Operation was done to ablate the diverticulum in three of the twenty-three cases. One has been described in the case report. One diverticulum, 3.5 cm. in diameter, was clamped, removed, and the stump inverted. X-ray follow-up showed a good result. The third was located in the region of the ampulla close to the ducts and was turned in by plication. X-ray follow-up in this case also showed a favorable result.

Etiology

In Guys Hospital reports of 1893, Perry and Shaw were of the opinion, as quoted by Edwards, that the pylorus is largely responsible for a rise in pressure within the duodenum. That is to say, when there is a peristaltic contraction in the lower duodenum with the pylorus closed, there is produced an abnormal pressure within the intervening loop. Weak areas in the wall, therefore, may be subjected to greater pressure than they can withstand, and a point of local dilitation results. Adhesions and traction in some instances seem to play a part in causation.

Symptoms

Prominent in the symptoms outlined by Edwards and quoted by Nagel is flatulent dyspepsia of a vague type, with a sense of oppression in the epigastrium. The histories often run back many years. There is a dull distress or a burning sensation in the epigastrium frequently following food ingestion. Nausea and vomiting may be accompanying symptoms, with relief of distress. Pearse observed that if there is retention in the diverticulum and at the same time local tenderness, the diverticulum is probably the cause of the patient's symptoms.

Diagnosis

The duodenal diverticulum can be demonstrated by x-ray, and the roentgenologist therefore pronounces the ultimatum. The location of the diver-

ticulum, as to its position in the first, second or third portion of the duodenum, can likewise be stated by the roentgenologist. The size of the diverticulum also should be noted, inasmuch as the large pouches cause most symptoms. A six-hour film to detect retention in the diverticulum is valuable. The presence, location, size, and six-hour retention of a duodenal diverticulum are, therefore, valuable points of interest to the surgeon.

Surgery

These diverticula are not easy of access to the surgeon. Those in the first portion are rare and are most likely the ones removed at the time of pyloric resections or are the ones which become symptomless thereafter. Those in the second portion are the most common and are the ones which may cause difficult surgical problems.

Lawson found that, of fifteen cases in which there was exploration of the abdomen, the surgeon did not attempt to locate the diverticulum in seven because of other findings regarded as the cause of symptoms. In eight cases where search was made for the pouch, it was found in six. Lahey states they have learned from experience that those diverticula which burrow into the head of the pancreas can be dissected only with the greatest difficulty. Pearse describes a method whereby he slits the diverticulum in order to insert the finger into it and thus help in the dissection, and he uses strong illumination to be sure the common duct and pancreatic duct are avoided. Neil MacLean opened the duodenum and through this opening inserted a finger into the diverticulum to aid in separating it from the pancreas. Nagel believes these diverticula should be resected and not inverted. One has to contend with the fact that these pouches may be collapsed when the surgeon is searching for them, which adds to the difficulty of locating them. Those diverticula beyond the second portion are more easy of access and may often be approached from below near the ligament of Treitz.

Prognosis

While few of these diverticula require operation, it is encouraging that 80 per cent of those treated, according to Morton, are relieved of their symptoms. Beals makes the significant statement that if duodenal diverticula were as accessible to the surgeon as is the appendix, we should soon learn more exactly the relationship between these pouches and the attendant symptom-complex.

Summary

Surgical treatment is indicated for a small percentage of duodenal diverticula. The larger ones are the chief offenders. Their clinical significance should be given careful consideration. If a duodenal diverticulum is associated with a diseased gall bladder or a peptic ulcer, it should be evaluated as to its possibile contributing nature in the patient's complaint.

The author reports a case treated, and twenty-three hospital cases reviewed, most of them in the age group over fifty. Three were treated surgically with good results. In the roentgen study, the presence, location, size, and six-hour retention are important. The surgical experience of various authors is herein discussed. The prognosis is encouraging unless serious complications exist.

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The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.—*Constitution of the World Health Organization.*

OFFICE PROCTOLOGY

A. H. BORGERSON, M.D.
Long Prairie, Minnesota

THE scarcity of hospital beds and the insistence of patients who have no time to stay in hospitals have combined to persuade us to undertake an increasing amount of rectal surgery in the office. Our methods of rectal treatment for ambulatory cases, and a new needle for retrograde injection of combined hemorrhoids, were presented to the Upper Mississippi Medical Society, May 11, 1946. Credit should go to Drs. Buie and Smith of Rochester, Drs. Fansler and Anderson of Minneapolis, and Dr. Frank Yeomans of New York, whose techniques have been modified to suit our purposes. These gentlemen have courteously entertained me at their clinics, and their publications have been freely consulted.

The rectal mucosa ends at the pectinate line which is marked by the anal papillae, the pointed upward extensions of the anal skin, above which extend the columns of Morgagni and between which lie the pockets of the anal crypts. Innervation above this line is autonomic and insensitive to ordinary pain stimuli. The skin below this line is supplied by peripheral nerves and is exquisitely sensitive. Branches of the internal pudendal nerve leave Alcock's canal as it crosses the obturator internus muscle just above the ischial tuberosity, and course medially through the ischiorectal fossa to supply the anal skin and the external sphincter. This makes it possible to anesthetize the anus by a nerve block, using the tuberosity as a landmark. As this does not block the autonomic supply of the internal sphincter it is also necessary to infiltrate, fanwise, on both sides of the sphincter in cases requiring complete relaxation. This thickened terminal portion of the circular muscularis of the rectum is in constant tone, except when reflexly relaxed during defecation peristalsis, and is aptly dubbed the "responsible" sphincter, in contrast to the external or "social" sphincter, loss of whose voluntary control results in musical and olfactory phenomena at embarrassing moments.

Rectal treatment must be preceded by a complete history and physical examination, with routine check on blood and urine. Carelessness in this respect saves no time in the long run, but invites disaster for the patient and embarrassment to the surgeon. It is not pleasant to discover rectal carcinoma in a patient who continues to bleed after his piles have been eliminated, or diabetes in a woman whose pruritis was not alleviated by injection treatment, or tuberculosis in one whose fistula has recurred. The treatment of piles by any method in the presence of a cirrhotic liver or an obstructing pelvic tumor is a light occupation. They will promptly recur.

The next step is always a careful digital and proctoscopic examination. Most rectal carcinomata can be felt with the lubricated finger, and all lesions below the sigmoid flexure can be seen through the proctoscope. Proctoscopy can be done on any examining table by using the knee chest position. The scope is introduced past the sphincters with the obturator in place. When the obturator is removed and replaced by the light, the rectum will balloon up as a result of the vacuum created by the falling toward the diaphragm of the abdominal viscera. This is safer and simpler than bulb inflation, which is seldom necessary. Next the instrument is gently advanced, under direct vision, past the valves of Huston and the rectal ampulla, to the terminal sigmoid. Although any lesion may be seen during introduction, a systematic inch-by-inch survey of the entire circumference is made as the instrument is withdrawn. Long applicators are used to wipe away any flecks of blood, stool or mucus, as these cling more readily to diseased portions than to the normally smooth and slippery mucosa, and may conceal the very lesion being sought. Biopsy may be taken with alligator forcepts or the diathermy loop. Bits of loose tissue are picked up on a wet applicator. Bleeding may be controlled by fulguration, applied with discretion to the anterior rectum above the cul-de-sac, where perforation can open the peritoneal cavity. X-ray examination of the rectum is superfluous and futile, but it is still our best means of visualizing the rest of the colon.

Our patients are told that piles are caused by standing upright on their legs. Since there are no valves capable of supporting the vertical column of blood in the erect trunk, the greatest pressure falls on the veins in the lower rectum.

The straining and milking down effect of passing hard stools blows up the weaker veins into bulbous varicosities, which are piles. This explanation promotes an understanding of the need for periodic checkup to catch recurrences in their early stages, and encourages co-operation in the establishment of proper bowel habits. The loose areolar tissue, containing the venous plexus, beneath the rectal mucosa permits this lining to move freely during defecation. If a large varicosity is extruded beyond the sphincter, it may be prevented by spasm from retracting. Venous return is shut off, and passive congestion is followed by edema, extravasation and painful inflammation, and there results a prolapsed thrombosed internal hemorrhoid. In combined piles, where the varicosities extend beneath the pectinate line into the subcutaneous fat, the thrombus may extend into the external portion.

Prior to thrombosis, the complaints are bleeding, protrusion, an aching but not severe pain, or a continued sense of fullness after defecation. The piles are better seen than felt, as submucous varicosities just above the pectinate line which elevate the mucosa into pink to purple, soft, bulbous masses which bleed easily on abrasion.

Piles are best treated by injecting 5 per cent quinine and urea hydrochloride in 2 per cent procaine into the loose areolar tissue surrounding the varicosity, not intravenously. Enough solution to distend the pile, without blanching, is injected, usually 1 or 2 c.c. into each of one or two hemorrhoids at a session. The pile is engaged in a Hirschman speculum, wiped clean, painted with antiseptic, and the solution injected through a tonsil needle on a Luer-Lok syringe. Much smaller amounts of 5 per cent phenol in cottonseed oil are used in patients who react unpleasantly to quinine. The effect is to tighten up the areolar tissue through fibrosis, thus obliterating or supporting the veins and also fixing the mucosa more tightly to the muscularis, an effect which finds its further application in the similar treatment of mucosal prolapse.

External piles are not injected because they are not troublesome, unless thrombosed, and because injection through the perianal skin is a very painful procedure. Their management calls for an occasional incision to shell out a thrombus, or the clipping off of a residual skin tag.

Combined piles may be injected with a retrograde needle (Fig. 1). These needles were first made to the authors specifications by V. Mueller of Chicago, in 1942. Subcutaneous varicosities may be as successfully treated as those beneath the mucosa. Tissue reaction to quinine and urea

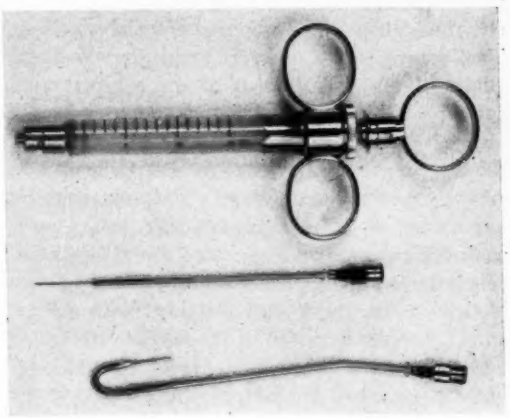

Fig. 1. Syringe and retrograde needle for injecting external hemorrhoids.

hydrochloride is the same. The oily solution has not been used in the subcutaneous fat for fear of fat necrosis. Injection of external piles has never become popular because of the pain incident to transcutaneous injection. The retrograde needle was designed to meet this objection. Using a side-slotted speculum of the smaller Fansler type, the needle is introduced, retrograde, into the hemorrhoidal mass above the pectinate line. This muco-cutaneous junction is freely mobile over the varicosity, which extends beneath it under the perianal skin. The submucous portion is first distended, then the needle is advanced outwardly, blowing up the tissue space beneath the crypts and papillae as it progresses into the subcutaneous portion of the pile, and finally injecting there a quantity sufficient to distend moderately the external portion of the hemorrhoid One must be careful not to puncture the skin or to raise an intracutaneous wheal, as this will result in the painful reaction the technique is planned to avoid. When the injection is completed, the needle is pushed back into the rectum to disengage the point, keeping the needle in the slot and the speculum farther within the rectum than the needle point. The point is then rotated away from the slot, where it may be easily withdrawn without hooking up the mucosa.

A thrombosed pile may be easily treated in the

office under procaine block. If the sphincter is adequately relaxed and dilated, a speculum is rarely needed. The thrombosed mass is grasped at its upper pole with Ochsner Forceps, pulled down, and a ligature of fine chromic gut is passed through the mucosa and about the submucous vessels just above the proposed site of excision. This suture is tied and left long. It should include all the tissue down to the sphincter but should not bite into the muscle. An ellipse of mucosa is excised, extending from just below the ligature, over the clot, to the perianal skin just without the anal verge. This extension is important, as it insures drainage and guards against the formation of infected pockets, perianal abscesses and consequent fistulas. The thrombus is cleaned out, the wound sprinkled with sulfonamide, and the long end of the ligature continued downward as a hemostatic, locked suture, closing the wound to the anal verge but leaving the lower end wide open. A vaseline gauze strip is placed over the wound and secured by tying it into the ends of the ligature. There is usually no difficulty with bleeding, but if any spurting vessels are encountered they should be separately secured by mattress ligatures before starting the closure. This avoids the accumulation of a hematoma which could be more distressing than the original thrombus.

The patient cleanses the anus with soapsuds after each stool and applies an external dressing of sulfathiazole ointment. Hot sitz baths alleviate postoperative distress and promote clean healing. On the third day, if there has been no stool, an oil enema is given. The gloved finger is inserted, the wound cleansed, loose sutures removed, and the wound painted with gentian violet. This is repeated twice weekly till healing is complete, usually in about three weeks. The remaining piles are injected during this healing period. Usually no sedatives or anesthetic ointments are required. Mineral oil is seldom used, as the dilating effect of a soft, formed stool is desired. A pint of water before breakfast and a regular morning stool habit are insisted upon, supplemented at times by such a bulk and jelly producing preparation as agar, psyllium or karaya. Any residual varicosities are treated after a month's interval, and a final checkup after six months advised.

Rectal fissure should be suspected whenever painful defecation is followed by a severe, toothache-like pain. The tormented victim postpones the ordeal until the stool is inspissated and impacted, when, finally, its passage is forced by a cathartic or an heroic effort. These diamond-shaped ulcers are usually found between an external skin tag, the socalled "sentinel pile," and a hypertrophied papilla at the posterior anal margin. The older ones are indurated, all bleed easily on abrasion, and their pink, inflamed floors are covered with a yellow, viscid exudate, unless it has been wiped off by a recent stool. Sphincter spasm is so marked and sustained as to make proctoscopic examination impossible without anesthesia. Even digital examination may be an agonizing ordeal. A cluster of submucous varicosities is usually found just above the enlarged papilla. The stubborn persistence of these ulcers in the presence of hemorrhoids suggests comparison with varicose ulcers of the leg. Permanent healing is more likely if the piles are eliminated. Fissure occurs most often at this site because the shelving forward of the posterior rectal wall directs the impact of the descending stool against the least elastic portion of the circumference, where the decussating fibers of the sphincter are firmly attached to the fibrous coccygeal tendon.

Many recent rectal abrasions heal with no treatment. A few recent fissures have healed after digital stretching and the application of silver nitrate. Few patients will permit such treatment in a well-developed fissure. The first essential in proper treatment is to secure sustained anesthesia and relaxation. One per cent Diothane or such an oily anesthetic as Zylcaine is used to block the sphincter on both sides. The sphincter is gently and gradually stretched as it relaxes, taking care to tear neither muscle nor mucosa. Mucosal lacerations and extravasations in or about the sphincter cause anal stenosis with consequent persistence of the fissure. The bivalve retractor-type Smith speculum gives adequate exposure. If the fissure is recent, soft, small and elastic, excision is unnecessary. The internal pile above is injected, and the granular, indolent ulcer surface is pooled up to the point of blanching with the same quinine solution with the deliberate intent to produce a superficial slough down to healthy, fresh tissue. The same result may be achieved by diathermy coagulation, but the author prefers to avoid this method. It is very easy to cook the tissues a little too deeply,

and a well-baked sphincter tends to be replaced by a fibrous, contracting scar.

If the fissure is large, chronic, or indurated, it should be excised in an ellipse wide enough to include both margins and extending from the hemorrhoid above to just outside the anal verge. The same preliminary ligature and continued suture technique employed in treating thrombosed piles is used, but the dissection must be carried right down to the bare sphincter, where may be seen or felt the so-called "pecten band," an annular zone of fibrosis caused by organization of the inflammatory exudate in the lymph spaces overlying the sphincter. This will not stretch, and must be severed with the scalpel to expose the healthy, meaty and elastic sphincter. The incision is closed to the lower edge of the sphincter, where the mucosa may be tacked down with a pair of interrupted sutures, leaving the lower end open past the anal verge. Dressings and after-care are the same as previously described. One must be particular to maintain dilation until healing is complete. The long-lasting anesthetic may be repeated, if needed, in patients in whom dilation is difficult to maintain.

Fistulas may sometimes be prevented by incising an infected crypt. A bent malleable probe or crypt hook is used to lift up the crypt wall, which is then snipped off under the probe with scissors. A persistent or neglected crypt infection may burrow along the lymphatics to the ischiorectal space, where an abscess forms and is incised, or finally breaks through the skin, establishing a fistulous tract extending from the crypt to the external opening. Early incision is indicated, as it prevents the extensive burrowing which too often results in the extensive, multiple branching fistulas, which are, indeed, a formidable problem. So-called "expectant treatment" entitles one to expect only this unpleasant result. Penicillin in procaine may be used if the abscess is too deep for ethyl chloride refrigeration. Drainage is better promoted by cutting off a corner of a crucial incision than by insertion of a gauze pack. A single strip of vaseline gauze may be inserted to the bottom of the abcess cavity. The finger should be inserted to feel out and break down any loculated pockets. The patient should be told that only the first part of a two-stage operation has been performed. Bleeding and the spread of infection are minimized if incision of the entire tract is delayed until inflammation has subsided and the wound contracted. Hot sitz baths are used after the first, large postoperative dressing. Meanwhile, sulfamerazine and a daily dose of penicillin in oil are useful. Only the simpler and more superficial fistulas should be treated in the office. If a malleable probe can be guided all the way through the fistula, it can be replaced by a grooved director, and the entire tract laid open by a single, straight incision onto the director. The operation is completed by trimming off the overhanging edges to form a gutter. The wound is sprinkled with sulfonamide and filled with vaseline gauze strips. Frequent dressings prevent bridging over, and must be continued until healing from the bottom up is complete. A straight radial incision through the sphincter is sometimes necessary, and heals without incontinence. Severing the sphincter in more than one place at the same time or cutting it obliquely invites this disaster.

Summary

Simple, proved methods for treating most piles and fissures and some fistulae, in the office by ambulatory methods, are described.

A new needle for retrograde injection of combined piles is presented.

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GETTING THE MOST FROM A PATHOLOGIST

CHARLES W. VANDERSLUIS, M.D.
Bemidji, Minnesota

EVERY year a certain amount of money is wasted on pathologic services. Some think that hospital standards requiring routine pathologic examination of every appendix, gall bladder, and fallopian tube are responsible for a good deal of this waste, inasmuch as the main gain usually is a written report by a disinterested party after the operation has been done. Furthermore, there is little evidence, from the type of tissues submitted for examination, that the certain knowledge of pathologic review acts as a deterrent to surgery. Admitting the questionable need of some of this expense, there is, in addition, a greater and more hidden waste—namely, that the doctor is not always getting the information he could get from pathological examination of his tissues. In some cases, this is due to misinformation from the pathologist but more often to misinterpretation by the doctor.

For example, let us consider the appendix. This vestigial remnant is responsible for a good part of the income of the surgical pathologist, and he sees a good many of them. If a smooth, normal-appearing appendix is submitted to him without a report of the clinical course and the total and differential white cell counts, it is very possible that he will get the impression that the patient may have been operated upon by a hurried doctor. Routinely, he will cut a block or two for the record. When he reviews the microscopic sections and sees nothing unusual, he will have little compunction about making a diagnosis of normal appendix or chronic appendicitis, depending upon the sensitivity of the referring doctor. Whichever diagnosis is made, it is apparent that the intent is to indicate that the operation was, at least, not a medical emergency. However, if the specimen is accompanied by a history of acute onset, rapid progress, and leukocytosis with an increase in neutrophiles, the pathologist will more likely view it with respect in spite of its possibly benign appearance, will choose the sites for his blocks with more care, and, in certain cases, make a smear of the contents of the lumen. He is sensitive about being unable to find disease when there is good presumptive evidence that it is present, but he is calloused to appendices because he sees so many which appear harmless.

A good deal of abdominal surgery has fallen into disrepute with the pathologist. Although he is not a practicing clinician, he has been trained in clinical diagnosis and knows its value. In cases where pathological examination of tissue is not conclusive, he can profitably use clinical facts when making a decision because his record stands, in many cases, as the final diagnosis. To deny the pathologist clinical information is shortsighted. He is usually in a better position to correlate clinical facts with what he sees than is the physician to correlate a description of what the pathologist sees with his clinical finding. That the pathological report is all-important with government agencies and insurance companies in judging the competence of surgical care is, in some circumstances, unfortunate, but the fact remains, nevertheless, that it does hold that position. Apparent discrepancy between clinical diagnoses and pathologic reports is considerable. Even though from 75 to 80 per cent of the inflammatory conditions in the abdomen are due to appendicitis, almost 50 per cent of the appendices submitted for pathologic examination (excluding those removed routinely in the course of other abdominal surgery) are pronounced normal or are given a comforting name. The surgeon can partially correct this discrepancy by being sufficiently specific in his indications for an operation to write them down for the pathologist. Many studies have shown a fair correlation between clinical and pathological data in appendicitis. By making careful clinical records, the operator will seldom have to shrug off a surprise report.

Many uteri are submitted for examination. Those which are normal in size and not accompanied by a clinical history are puzzling to the pathologist. Money is often wasted upon an examination of this type because the surgeon who removes a normal-appearing uterus usually knows more about it than the pathologist who sees it postoperatively. Such an organ should be ac-

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companied by a history. To insure complete fixation, it should be opened by the surgeon beforehand so that the endometrium will be exposed to the formalin. It should be incised exactly through the midline from front to back. Larger uteri should also be cut open in this manner, and tumor masses should be incised in order to allow more complete fixation. A history of the reason for removal, unless the pathologic condition is obvious, always brings a more careful examination and a more considered diagnosis.

Nothing seems to provoke more remarks among pathologists than the receipt of corpora lutea as surgical specimens. Sometimes such an object is the only one removed in a laparotomy, probably as a side excursion from a uterine suspension. As we all know, a corpus luteum is physiological and harmless, and is easily diagnosed grossly. It is rounded and firm and sometimes measures more than an inch in diameter. The wall is yellow and sometimes wavy in outline, and the cavity contains bloody fluid. Its removal is a surgical mistake, and its histological examination is a waste of time. The pathologist makes his slide from a small part of it only for the record. Many small, smooth-walled cysts of the ovary are also removed. These are usually harmless. The distinction between follicular, luteal, and endometrial types can usually be made only on histological examination, and sometimes not then.

Occasionally, thyroid glands are submitted for examination. As a result of clinical study of the patient the surgeon usually pretty well knows the nature of every thyroid which he removes, but he is often disappointed by the pathological report. The main reasons for this diappointment are the shortcomings of pathological examination and the usual circumstance that the pathologist does not have the clinical information which the surgeon possesses. If the patient with a diffusely hyperplastic gland and symptoms of hyperthyroidism has been treated with iodine for some time and the symptoms relieved, the gland on pathologic examination may not be diagnostic of past difficulty. Generally, there are remaining foci of lymphocytes, but the epithelial hyperplasia and reduction of colloid so characteristic of Graves' disease may no longer be apparent. Without a clinical history, the pathologist does not always feel justified in making the diagnosis of treated Graves' disease. This is sometimes disconcerting to the surgeon, in view of the incidence of continuation or recurrence of symptoms in this condition. If a patient with a nodular goiter of some years' duration develops symptoms of toxicity and undergoes thyroidectomy, the gland will show mainly its adenomatous character. Histological evidence of toxicity, at best present only between the nodules and further diminished by iodine treatment, is most often absent. This cannot be taken as proof that the gland was not responsible for symptoms. The pathologist usually makes a diagnosis of nodular or adenomatous goiter, without reference to toxicity. By observing the clinical course, the surgeon must settle that question for himself.

Of most direct service to the patient and physician is the correct interpretation of biopsies. The most frequent specimens of this type are uterine curettings. If only a few curettings are present, the diagnostic probabilities lie between incomplete curettage and postmenstrual or senile endometrium. Malignancy is not to be expected in a small volume of curettings. If a great amount is present, the gross conclusion is that either hyperplasia or carcinoma is the likely diagnosis. Microscopic examination is made in every case, but sometimes all fragments are not sectioned. In order to keep the pathologist on his guard the surgeon should make a thorough curettage and submit all of the tissue free from blood. It is much easier to separate the tissue from the blood before the mixture has been put into formalin. Then, if the pathologist receives a large amount of curettings, he will be more on the alert for malignancy. Along with the specimen, the referring doctor should send a summary of symptoms, menstrual history, and, without fail, the age of the patient.

It is not often that a pathologic examination of endometrium gives the reason for uterine bleeding. If a definite cystic hyperplasia or a carcinoma is found, the answer probably lies here. In most cases, however, the endometrium appears normal and is described according to its stage of development in relation to the menstrual cycle—either proliferative, secretory, or premenstrual. If the endometrium is of the secretory or premenstrual type, it may be assumed that the patient ovulates normally and that a corpus luteum has been formed. This knowledge is of some help because anovulatory uterine bleeding is fairly common in the early and latter parts of menstrual

life. Most endometrium removed, however, is found to be in the proliferative stage. This is because normal endometrium in women past the menopause is normally of this type, ovulation no longer taking place. A single curettage showing proliferative endometrium in a cyclic woman obviously does not prove anovulatory bleeding. A second biopsy should be taken two weeks later. Cystic and hyperplastic changes occur almost exclusively in proliferative endometrium of women just past the menopause and are signs of prolonged, unopposed estrogen activity.

Decidual transformation of endometrium is sometimes found on histologic examination. If chorionic villi are found with the decidual cells, the diagnosis of intra-uterine pregnancy is established. If chorionic villi are not found, however, evidence of intra-uterine pregnancy is not complete because uterine endometrium undergoes identical decidual change of pregnancy in 50 per cent of cases of extra-uterine gestation. The finding of advanced degenerative changes in decidua, however, points to aborted intra-uterine pregnancy.

Oftentimes the real answer to the problem of uterine bleeding lies outside the endometrium, and the doctor must assure himself that there is no leukemia, purpura, anemia, ovarian tumor or uterine myoma. The question of a submucous myoma cannot be settled by examination of the endometrium, but the operator might be able to feel a projecting fibroid with his curette. An ovarian tumor, especially in obese women, occasionally escapes earnest efforts at detection by pelvic examination and will only be found by laparotomy.

Cervical biopsies are frequently submitted. Accompanying histories should include the age of the patient, notation of previous pregnancies and the gross appearance of the cervix. If the biopsy is made so that a normal portion of mucosa is included, it may be possible for the pathologist to pick up a precancerous or early cancerous lesion where otherwise he might not be able to say. The specimen should be cut deeply enough to include some of the underlying tissue of the cervix so that the degree of epithelial penetration can be determined. It is of great importance that the biopsy be taken perpendicular to the surface, so that the resulting section will show the epithelium in strict cross-section and not obliquely. The possibility of a section of epithelium being oblique is constantly kept in mind by the pathologist when making a decision between malignant and nonmalignant thickening. Oblique sections are sometimes impossible to read reliably.

The decision between when to biopsy and when to attempt removal of a lesion without knowing its nature is important in many instances. In case of a mass in the breast it seems best, as a general plan, to limit initial surgery to its adequate local removal, unless it is obviously malignant. Pathological examination is probably more useful in saving benign breasts than in causing radical removal of malignant ones. There is less harm in leaving an operation temporarily unfinished in the occasional case than in removing an entire breast and possibly doing a radical operation for a few cysts or fibroadenomata. If the removed mass does prove to be cancer, a block dissection can still be done. Before putting such a specimen into formalin it is desirable to dissect the axillary lymph nodes from it. Finding these nodes by palpation is much easier in the fresh specimen than in a formalized one, in which case the fixed fat and the nodes have about the same consistency. Putting these nodes into a little gauze sack will insure pathologic examination of all of them and a much more accurate prognosis.

The diagnostic procedure to be followed in lesions of the lip depends to some extent upon the treatment intended. Small carcinomas are very satisfactorily treated with x-ray or radium, but they should first be biopsied. It is the practice of some men to biopsy without anesthesia, removing only a little epidermis. Unforunately, some of these specimens are not diagnostic because too little dermis is included for estimation of epithelial penetration, and because so little tissue is present that orientation for a truly perpendicular section is impossible. A lip biopsy should be reasonably deep, even though narrow. Since many early lesions might just as easily be removed as biopsied and radiated, it is just as well to dissect these out with normal tissue on all sides and have them examined. If early cancer is present and no cervical nodes are felt, it is permissible to let the matter rest. In case of a large lesion, a biopsy should first be taken. If the report is that of squamous cell carcinoma, a complete dissection of the tumor and of the submental and subaxillary lymph nodes should be carried out.

The failure to biopsy before removal has often been regretted in tumors of the subcutaneous tissue or muscle. All of these masses should be biopsied as soon as discovered. If they are small and discrete, they can be widely removed at the first sitting. If they are large, however, a biopsy should suffice for the first attack. Many tumors thought to be simple fibromas are, in reality, fibrosarcomas or myxosarcomas with a marked tendency for local recurrence. It is more economical of the patient's tissue to do a wide dissection of a large malignant tumor after biopsy than to perform a routine removal with a practical certainty of recurrence if examination proves the presence of malignancy.

Lymph nodes are often submitted for diagnosis. In case of a suspected lymphoblastoma, the doctor should find out the duration of enlargement of the nodes, the location of those enlarged, size of the spleen and liver, width of the mediastinum, presence or absence of pulmonary involvement, and the nature of the blood picture. Sometimes, in a single node there is poor histological distinction between lymphosarcoma, Hodgkin's disease and leukemia. The physician who wants this distinction made should supply the pathologist with all of the information mentioned above. Since there is a certain overlapping of histological as well as clinical criteria for these diagnoses, it is possible that the doctor will have to be satisfied for the time being with a diagnosis of malignant lymphoblastoma, which is an inclusive term. Some pathologists are now distinguishing reticulum cell sarcoma within the group of lymphosarcomas by the larger and more irregular character of the cells.

In addition to the specific tissues referred to above, which, with gall bladders and uterine tubes, are the most numerous of the surgical specimens, there are tumors of bone, rectum, skin, mouth, ovary, vagina, parotid and intestine. Branchial and thyroglossal duct cysts and fistulas, anal fistulas, cutaneous ulcers and granulomata fairly well round out the list. A history of the lesion and the age and other pertinent facts about the patient should accompany all of these tissues.

Detection of cancer cells in pleural and ascitic fluid is sometimes possible by histologic methods. If it is desired to submit such fluid for examination, a certain amount of preliminary work is necessary. The entire amount should be centrifuged or the cells allowed to settle out in a refrigerator. The supernatant fluid is then poured off and discarded. Smears are made from the sediment and are air-dried. The remaining sediment is then collected and allowed to settle again, or it is centrifuged in order to concentrate as much as possible. The remaining supernatant fluid is discarded and 10 per cent formalin is added to the settled material, which is then sent to the pathologist along with the smears.

Blood smears are often submitted for diagnosis, and usually with too little data. A history of the illness, the hemoglobin value and red and white cell counts should be sent with thin, even blood films on clean slides. Rinsing the slides in 95 per cent alcohol and drying, before making the smears, will add to the ease of making even films. Slides which are stained immediately are always better than those submitted unstained. Wright's stain and distilled water for dilution and washing will usually produce good results. Glenwood-Inglewood triple-distilled water, sold in gallon bottles by a Minneapolis concern, or parenteral flask water, are ideal.

While peripheral blood studies are indispensible in many cases, they are not always diagnostic of specific disease, and now some pathologists want bone marrow to prove or disprove a condition suspected from study of the peripheral blood. The diagnostic value of expert bone marrow examination in obscure anemias and in unexplained chronic febrile conditions is gradually being appreciated.

In his role of consultant, the pathologist is naturally in a position to supplement the education of every doctor. Most men in the field are willing to return microscopic sections of material studied to the referring physicians. Some doctors profess histology to be out of their sphere and do not consider their judgment or knowledge in this field sufficient to enable them to gain anything from a study of sections. With a good pathologic report at hand, however, this is not the case, and many will find the study of surgical sections a refreshing departure from the routine of clinical practice.

The press of time prevents the average doctor from putting the acid test to much of his clinical diagnosis, but here the pathologist can be of further service. Post-mortem technique is not difficult, and any doctor can learn it from the observation of a few dissections, followed by practice.

(Continued on Page 309)

CLINICAL-PATHOLOGICAL CONFERENCES

KIMMELSTIEL-WILSON SYNDROME

A. J. HERTZOG, M.D., and W.D. HAYFORD, M.D.
Minneapolis, Minnesota

DR. WILLIAM HAYFORD: (A-46-2190). This forty-nine-year-old woman was first admitted to the Minneapolis General Hospital in 1932, complaining of having had diabetes mellitus for three years. Her blood pressure was 138/80. A urinalysis showed 4 plus sugar and was positive for acetone. The blood sugar at this time ranged between 190 and 240 mg. per cent. A glucose tolerance test showed a diabetic curve. She was discharged on 25 units of regular insulin daily. She was next seen in 1935. Her blood pressure was 136/90. Blood sugar was 240 mg. per cent. She had not taken insulin during the previous year for financial reasons. Her diabetes was controlled and she was discharged on 40 units of regular insulin daily. Her final admission was on August 15, 1946. She was complaining of swelling of the legs and abdomen for the past two years. Acute complaints were swelling of the upper extremities and eyelids, and nausea and vomiting. For the past few weeks she had blisters of the legs. When they broke, they drained for long periods of time. She was short of breath. The edema of the lower extremities gradually progressed upwards to involve the hips. In the last few months her abdomen had begun to swell. She required three pillows in order to sleep at night. She urinated four times a day and only small amounts.

On physical examination, the blood pressure was 190/92. The pulse was regular and 80 per minute. The patient was slightly dyspneic. There was edema of the eyelids. The breasts were distended with fluid. The tissues of the chest posteriorly pitted on pressure. Auscultation of the lungs demonstrated moist rales bilaterally in the lower lung fields. The respiratory rate was 32 per minute. Heart examination showed the point of maximal impulse to be 11 cm. to the left of the midsternal lines. There was a slight apical systolic murmur. There was marked ascites and grade 4 pitting edema of the lower extremities. There were small bullae on the lower legs, some of which had broken and were oozing fluid. There was two plus pitting edema of the upper extremities and three plus pitting edema of the sacral region.

Urinalysis showed a specific gravity of 1.034 with 3 plus albumin and occasional red and white blood cells. The urine sugar varied with the amount of insulin. Every urinalysis showed from 3 to 4 plus albumin with many red cells and pus cells. A quantitative albumin determination showed an excretion of 12 grams of albumin in a twenty-four-hour specimen. Blood urea nitrogen was 23 mg. per cent. Blood sugar was 140 mg. per cent. Plasma proteins varied from 6.7 to 6.5 grams per cent. Quantitative determinations of plasma proteins showed 3.93 grams of albumin and 2.73 grams of globulin. On August 23, 1946, her venous pressure was 21 cm. of citrate. The circulation time was 15 seconds. She was given mercurial diuretics and subsequently voided 7,675 c.c. of urine. Thoracentesis was done and several thousand cubic centimeters of fluid were removed from her chest. The hemoglobin, white blood count and differential blood count were within normal limits. The prothrombin level was normal. Serology was normal. Blood chlorides and carbon dioxide combining power were within normal range. The P.S.P. test for kidney function showed a total excretion of 35 per cent in two hours.

On September 22, 1946, the patient had a sharp nonradiating precordial pain and a pulse of 120 with a gallop rhythm. The symptoms were relieved by nitroglycerine. On September 27, the venous pressure was 25 cm. of citrate. The anasarca persisted. On November 5, 1946 while sitting on the side of her bed, she expired very suddenly.

DR. HERTZOG: Does anyone wish to explain the severe generalized edema that occurred in this diabetic woman?

INTERN: Kimmelstiel-Wilson's syndrome.

DR. HERMAN KOSCHNITZKE: When a diabetic develops generalized edema with a marked albuminuria, we naturally think of Kimmelstiel-Wilson's syndrome. The plasma protein level in this case was not lower than 6.5 grams. She had hypertension and an enlarged heart. She had an attack of cardiac pain relieved by nitroglycerine. An electrocardiogram showed low voltage of the QRS complex, a slight ST depression, and tachycardia with a gallop rhythm. Her venous pressure was 25 cm. of citrate. Hence she definitely had heart failure. We thought that the edema, however, was out of proportion to the degree usually seen in heart failure. It is reasonable to believe that the lowered plasma protein may have been a contributing factor in her generalized anasarca.

DR. HERTZOG: Kimmelstiel and Wilson[3] called our attention to the so-called intracapillary glomerulosclerosis of the kidneys in diabetes mellitus. They emphasized a nephrotic syndrome associated with this renal lesion in diabetics. The Kimmelstiel-Wilson syndrome has been used very loosely to describe the edema

From the Department of Pathology, Minneapolis General Hospital, A. J. Hertzog, M.D., pathologist.

due to heart failure in diabetics. A restricted definition would be edema in a diabetic resulting from albuminuria and hypoproteinemia as a result of intracapillary glomerulosclerosis of the kidneys. Hypertension occurs because of the vascular changes in the kidneys. Most of the cases give a history of a normal blood pressure at one time. The hypertension as in this case is of gradual onset. Porter and Walker[4] describe the typical events of a case of Kimmelstiel-Wilson syndrome as shown by one of their cases. Diabetes mellitus was diagnosed in 1929 at the age of thirty years. In 1932, albuminuria, mild edema, and hypoproteinemia were first noticed. Blood pressure was 98/65. In 1937, edema was marked. The blood pressure had risen to 160/80. Albuminuria was 3 plus. Total plasma proteins were 4.1 grams per cent. In 1938, blood pressure was 180/95. Anasarca was marked. Renal insufficiency developed and she expired. Dr. Bell[2] has studied the kidneys of 606 diabetics at autopsy. He found the lesion of intracapillary glomerulosclerosis of both the nodular and diffuse type in 22 per cent of males and 36 per cent of females. One can diagnose about 20 per cent of cases of diabetics at autopsy from the microscopic findings in the kidneys alone. Allen[1] believes because of the high incidence and clear-cut character of the glomerular lesion in diabetics, the kidneys offer the most reliable histologic diagnosis of diabetes mellitus of the age group over forty years. We can diagnose about 50 per cent of diabetics from the changes in the islands of Langerhans with the usual hematoxylin and eosin stain. When the beta granules of the islands are studied with the Gomori stain, this percentage goes up considerably. In Dr. Bell's series only about one-third showed appreciable edema in spite of the renal lesion. The edema when present appeared to be due to heart failure rather than hypoproteinemia. Diabetics today die largely of complications related to cardiovascular disease rather than coma. The marked tendency of a diabetic to develop arteriosclerosis at an early age appears to be uninfluenced by insulin therapy. Dr. Hayford will give the autopsy findings.

Dr. William Hayford: The body was that of a middle-aged female, measuring 161 cm. and estimated to weigh 160 pounds. There was generalized anasarca present with marked pitting edema of the lower extremities. The abdominal cavity contained approximately 3,500 c.c. of straw colored fluid. Each pleural cavity contained approximately 800 c.c. of similar fluid. The heart weighed 440 grams. There was moderate hypertrophy and dilatation of both ventricles. There was a large fibrous scar resembling a healed infarct that involved the greater part of the left anterior ventricular wall. The coronary arteries showed grade 4 sclerosis with complete occlusion of the anterior descending branch of the left coronary. The cardiac valves appeared normal. The lungs showed moderate generalized edema and atelectasis as a result of the hydrothorax. The liver was enlarged and weighed 2,350 grams. It had the gross appearance of severe passive congestion. The pancreas appeared to be of normal size and consistency. The right kidney weighed 210 grams and the left 240 grams. Both kidneys were large, pale, and finely granular. The remaining organs showed nothing of note.

Dr. Julian Sether: The microscopic slides show passive congestion of lungs and liver. The lungs contain many macrophages filled with brown pigment as found in the so-called "heart failure" cells. The myocardium shows the picture of an old myocardial infarct with a large fibrous scar. The pancreas with a hematoxylin and eosin stain shows partial hyalinization of many islands. A Gomori stain shows marked reduction of the beta cells of the islands. It is estimated that the islands do not contain more than 10 per cent beta cells. Our interest is naturally centered on the kidneys. The afferent arterioles show marked subintimal hyalinization and thickening of the walls. The hyaline material extends from the arterioles into the glomerular capillaries to cause a marked intercapillary thickening. The hyaline material is deposited between the glomerular capillaries. Most of the glomeruli show this lesion to be diffusely distributed throughout the tuft. An occasional one shows the hyaline material to be localized and circumscribed in distribution. There are some areas of cortical atrophy present. The tubules show nothing of note.

Dr. Hayford: The anatomical diagnosis then is (1) diabetes mellitus, (2) intracapillary glomerulosclerosis of the kidneys, (3) hypertrophy and dilatation of the heart (hypertension), (4) coronary sclerosis with myocardial fibrosis, (5) passive congestion of liver and lungs, and (6) bilateral hydrothorax and ascites. We considered the edema to be due largely to heart failure. It is plausible to believe that the lowered plasma proteins may have been a contributing factor to her generalized anasarca. In reviewing the literature on Kimmelstiel-Wilson's syndrome, one is impressed by the lack of quantitative studies. Few cases record the plasma protein level and extent of heart failure. Many times the diagnosis was made on patients who were in a moribund state on admission to the hospital and without benefit of autopsy confirmation.

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DIAGNOSTIC CASE STUDY

ARTHUR H. WELLS, M.D., OLIN W. ROWE, M.D., and HAROLD H. JOFFE, M.D.
Duluth, Minnesota

DR. A. H. WELLS: We have a most remarkable diagnostic problem of the dramatic and rapidly fatal type.

DR. O. W. ROWE: I saw this fifteen-year-old school boy in his home about forty hours before his death and three days after he had developed abdominal distress, fatigue, and difficulty in breathing. These symptoms were first noted after the boy lifted a heavy boat anchor out of the river. They gradually increased in severity. He had been under my care since birth, and was in apparent excellent physical and mental health at the time of onset of his present illness. He was lying on his left side, a little cyanotic and breathing rapidly. He pointed to the mid upper third of the abdomen as the seat of pain. The lung excursions were equal. Heart sounds were faint. There were confused faint murmurs, one of which was systolic, apical, and apparently not transmitted. His pulse was 125 per minute, faint and regular. I was unable to get his blood pressure. The abdomen was soft and not tender. My immediate diagnosis was that of acute cardiac condition, possibly pericarditis with effusion.

At the time of admission to the hospital fifteen hours before death, the physical examination revealed a robust fifteen-year-old boy, measuring 67 inches and weighing about 160 pounds, in acute distress with dyspnea and cyanosis. He was very weak and tended to lie on his left side. Circulatory collapse was continuous. His pulse was 68, respirations 24, and rectal temperature 102.4° F. There was air-hunger type of respiration with limited but equal expansion of the lungs. The apical beat of the heart was not visible or palpable. The heart sounds were weak and distant. A diastolic apical murmur was heard on one examination. A doubtful pulsus paradoxus was noted and later pistol-shot sounds were heard over the femoral arteries. There was some tenderness in the epigastrium. Otherwise, the abdominal examination was entirely normal. His distress had become continuous and located much of the time in the lower thorax.

Two consultants, Dr. F. J. Hirschboeck and Dr. S M. White, could hear a pericardial friction rub the first day of his illness which disappeared later. Aspiration performed by Dr. M. G. Gillespie failed to produce any fluid from the pericardial sac. The consultants felt that the patient had a circulatory collapse of unknown etiology.

A portable film of the chest revealed no enlargement of the cardiac shadow or distortion of the shape of the heart. There was slight congestion in both lungs according to Dr. Arden L. Abrahams. Dr. S. H. Boyer, Sr., interpreted the electrocardiograms (Fig. 1) as follows: rapid rate and regular rhythm; ST_2, depressed, rises with slight concavity to pointed apex; T_3 inverted, T_4 upright, and $T_{1\text{-}2\text{-}4}$ upright, do not exceed normal voltage. The diagnosis was that of auricular tachycardia, T_3 inversion. In the absence of other signs and characteristic features of posterior infarction, such

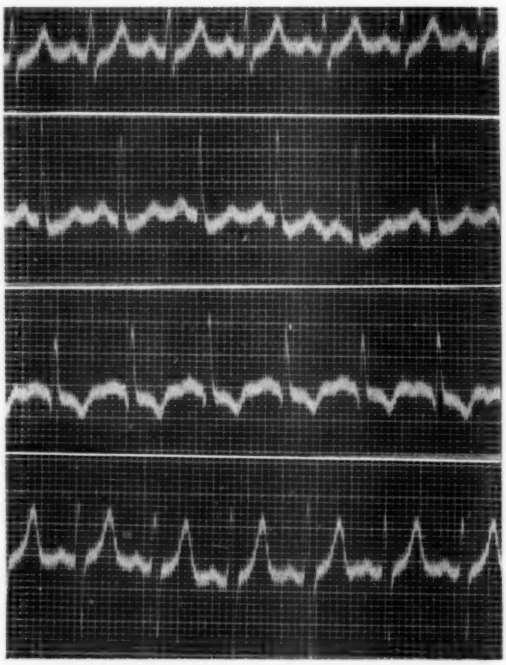

Fig. 1. Electrocardiograms leads 1, 2, 3, and 4 in order.

inversion is normal to childhood and even in youth may be accepted as of no significance unless later records disprove this. ST_2 depression is sometimes seen in pericarditis. There was a white blood count of 17,500 with 57 per cent neutrophils, 41 per cent lymphocytes and 2 per cent monocytes.

He was kept on absolute bedrest with nasal oxygen to 6 liters, coramine 2 c.c. every three hours, light diet, fluids not to exceed 2,000 c.c., and one hypodermic injection of morphine, grains 1/8. He continued to complain of abdominal and lower thoracic distress. He was constantly cyanotic and his weakness was progressive and severe. He vomited small amounts of bile stained fluid twice during his last fifteen hours. During the last nine hours his body was cold and clammy. His blood pressure and pulse rate were unobtainable. Respirations increased to 40, and the temperature reached 105° F. He became restless and irrational during the last two hours.

From the Department of Pathology, St. Luke's Hospital, Duluth, Minnesota. Clerical Assistance by Miss Faith A. Gugler.

DR. A. H. WELLS: The case is open for diagnosis.

PHYSICIANS: Acute pericarditis, acute rheumatic pancarditis, Fiedler's myocarditis, coronary thrombosis, acute endocarditis with ruptured bicuspid aortic valve, acute cor pulmonale of unknown origin.

Fig. 2. The rhabdomyosarcoma almost filling the right auricle and ventricle.

Necropsy

DR. A. H. WELLS: The post-mortem examination revealed a large, hemorrhagic, friable, pedunculated tumor mass (Fig. 2) measuring 12 cm. long and 6 cm. in diameter at its largest dimensions. It hung from a site of attachment 2.5 cm. in diameter directly overlying the usual site of the foramen ovale in the right auricle. The mass filled the tricuspid orifice and extended into and almost filled the right ventricle. There was not more than a 3 mm. extension into the interauricular wall. The cardiac cavities, valves, vessels, pericardium, and myocardium were otherwise entirely normal. The heart weighed 360 grams. There was no evidence of chronic passive congestion, edema, metastases, congenital anomalies or significant change in other organs. The brain was not examined.

Microscopic.—Possibly 95 per cent of the cardiac tumor mass was necrotic and hemorrhagic. A few preserved areas were composed of a moderately cellular, highly anaplastic lesion, characterized by a predominance of long spindle-shaped cells, with occasional larger multinucleated, rounded, or elongated cells. A finely granular cytoplasm frequently contained longitudinal and cross striations (Fig. 3). The nuclei tended to be oval or elongated and had a hyperchromatic granular chromatin which on occasions appeared in ill-defined linear arrangements. No "spider cells" of congenital rhabdomyoma could be found.

In conclusion, this otherwise normal fifteen-year-old boy died as the result of tricuspid block caused by a pedunculated rhabdomyosarcoma of the right interauricular septum.

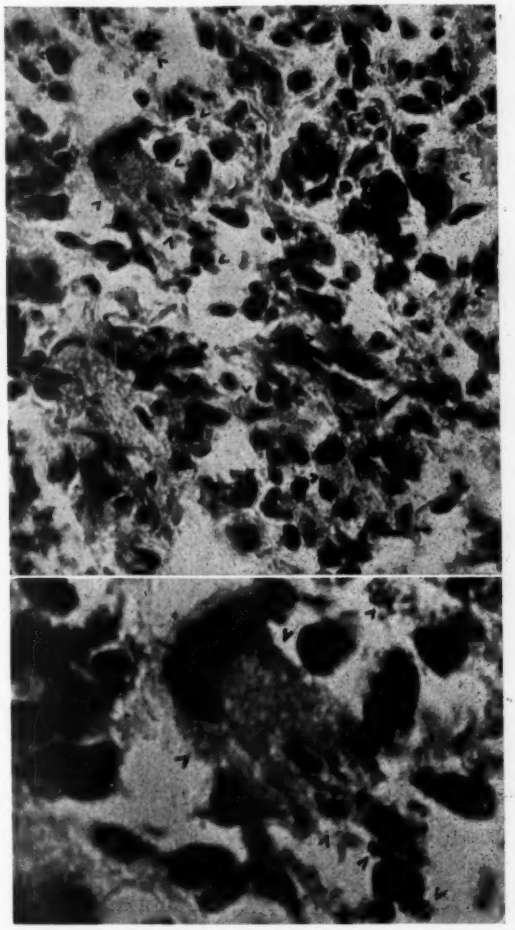

Fig. 3. (above) Phosphotungstic acid, hematoxylin stained preparation with oxer-exposed prints revealing relatively faint cross striations (indicated by arrows) in the cytoplasm of embryonic muscle cells.
Fig. 4. (below) Enlarged view of a selected field of Figure 3 with the same over-exposure of the print.

Discussion

In spite of the rarity of primary tumors of the heart, the subject has been reviewed[3,6,14] repeatedly, so that many facts concerning these lesions are well organized and the controversial subjects clearly defined. The exact frequency of these neoplasms has not been determined at present since as many as 30,000 autopsies have been performed[13] without finding a single case. In other

instances, 8,550 necropsies produced four primary tumors,[10] 1,200 examinations revealed three cases,[12] and in our hospital one case was found in the last 3,000 autopsies. By 1945[13] primary heart tumors totaling 163 had been counted in the literature. There were sixty-three "authentic" cases[2] of rhabdomyoma and apparently only four cases[7,8,9] of rhabdomyosarcoma of the heart.

The primary tumors of the heart can be readily classified into five groups: myxoma, fibroma, rhabdomyoma, sarcoma, and rare miscellaneous tumors. The malignant varieties represent 29 per cent of the total.[8]

Pathology

The myxoma is the most frequent of the primary cardiac tumors. Its benign, frequently pedunculated nature, its usual site of attachment on the left interauricular septum, and its occasional mitral stenotic clinical syndrome, sometimes altered by the position of the patient, make it the one heart tumor which might be recognized and cured by operation. The exact nature of this lesion has been debated. Some feel that it is not a true neoplasm but a myxomatous change in an edematous thrombus. The majority favor its neoplastic nature. A poorly cellular, edematous, Wharton's jelly type of tissue bespeaks a slow-growing benign character.

Small, rounded or papillary, generally pedunculated tumors composed of adult fibroblasts form the second most common group of heart tumors (fibromas). These have been found attached to some one of the heart valves. They have been innocuous and consequently innocent pathologic curiosities.

The benign rhabdomyomas are undoubtedly the most intriguing of the cardiac tumors. Over half of the cases occur in the first year of life, and only seven cases have been described in patients over fifteen years of age.[2] In 50 per cent of the patients with this lesion, there is an associated tuberous sclerosis of the brain.[8] One is also very likely to find other congenital anomalies, including cleft palate, harelip, cystic kidneys, multiple gliomas, hypernephroma, sebaceous gland adenomas, embryonic rests in the kidney and malformations of the pancreas. These frequently associated dysontogenetic lesions are a strong argument in favoring the common opinion that rhabdomyomas of the heart are not true neoplasms but hematomas. They are described in three gross forms[2]: single nodules usually near the apex; multiple nodules scattered through the heart; and, rarely, diffuse involvement of the myocardium even to the point of complete replacement. The cells composing these nodules are tubular and similar to those found in the embryonic heart muscle of the thirteenth week of fetal life.[5] Their large glycogen content results in a typical "spider-cell" appearance. When cut at a right angle to the length of the cell, strands of cytoplasm suspend the centrally placed nucleus to the thick outer wall. The cytoplasm may have cross striations. The hollow spaces contain glycogen.[2]

Only one nonconvincing case of malignant transformation of a rhabdomyoma to a rhabdomyosarcoma has been described.[8] It is entirely possible that rhabdomyosarcomas of the heart are a separate oncologic entity. The finding of typical multiple rhabdomyomas, tuberous sclerosis or other commonly associated lesions in a patient with a rhabdomyosarcoma seems essential before relating the two conditions.

It is entirely possible that the last relatively large group of primary cardiac neoplasms, the sarcomas, may contain instances of rhabdomyosarcoma without the necessary identifying striations. The majority of the sarcomas described[14] are simply designated as round cell, spindle cell, giant cell, or myxosarcoma. They occur at any age. They generally arise in the auricles, especially on the right side, and often from the interauricular septum. Occasional metastases to other organs are recorded. At times they become huge before causing death.

Secondary tumors of the heart are more frequent than the primary neoplasms, occurring in approximately 7.3 per cent of all deaths due to malignancy.[11] They are metastatic from practically all sites of carcinomas, sarcomas, melanomas, and the leukemias. The origins of greatest frequency are the bronchogenic and breast carcinomas.[11] However, the incidence of heart involvement in melanomas, reticulum cell sarcomas, and leukemias may be over 50 per cent. They are found in any part of the heart. Possibly because of the great preponderance (three fourths) of cardiac venous return through the Thebesian venae minimae into the right ventricle (Kretz) most of the metastases are found in its walls. It has become obvious through the years of post-mortem examinations that those malignancies which invade the heart usually are not inhibited by the other tissues seldom involved by metastases, such as the spleen, pancreas, thyroid, and voluntary muscle. They generally have a very wide distribution of metastasis and are quite embryonic in type. This obvious immunity of specific tissues to metastases could be the clue leading to the discovery of an efficacious therapeutic extract for the control of cancer.

Clinical Recognition

Primary or secondary heart tumors cause cardiac embarrassment by (1) mechanically blocking of a valve (mitral and tricuspid), (2) interference with transmission of the electrical impulse, (3) pericardial effusion, and (4) extensive destruction of myocardium by infiltration. These various lesions can give rise to almost any sign or symptom of heart disease. However, there are certain manifestations or cirumstances which have aided in the recognition of neoplasms in the heart.[9,14] The ball valve action of a tumor may cause a murmur which changes or disappears with change of position and the effect of gravity on the tumor mass. The electrocardiogram[1] may demonstrate a heart block or bundle branch block which cannot be easily explained because of lack of the other signs pointing to coronary disease. The pericardial effusion is frequently hemorrhagic and occasionally contains demonstrable neoplastic cells. Malignancies of the heart causing cardiac embarrassment are generally large and at times cause distortion of the shape and size as best demonstrated by roentgenologic methods. What intravenous radio-opaque dyes can do in demonstrating these lesions needs further elucidation. In any patient with known malignancy, the sudden onset for cardiac symptoms may well be on the

basis of cardiac metastasis. Intractable myocardial insufficiency without obvious cause may be on a tumor basis.[9,14]

Although very few tumors of the heart have been recognized as such prior to necropsy, the time should come when a benign pedunculated myxoma of the left interauricular septum will be clinically recognized and surgically cured. More alert physicians are already metastatic-cardiac-tumor conscious.

Summary

1. A fifteen-year-old boy developed abdominal and thoracic distress, muscular weakness, and dyspnea, progressing to circulatory collapse and death over a five-day period.

2. Necropsy revealed a rhabdomyosarcoma of the right interauricular septum with much necrosis and recent hemorrhage which had blocked the tricuspid valve.

3. This appears to be the fifth rhabdomyosarcoma of the heart in the world literature.

4. A very brief review of the more important facts and theories concerning both primary and secondary neoplasms of the heart is recorded.

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HISTORY OF THE CIRCULATION

(Continued from Page 267)

that they exist. It must be recalled that Cesalpino also suggested that an anastomosis existed between the arteries and veins. Harvey further explained that both the arteries and the veins contain blood and that movement of the blood is progressive, not undulating. He also showed that the functional center of the cardiovascular system is the heart, not the liver.

In this rather brief review of the history of the discovery of the circulation of the blood, facts have been recorded as they are found in the annals of history. After these many centuries the primary concern is no longer with priority of discoverers but rather with the importance of observations and conclusions as recorded by the contributors. History unmistakably inscribes the chronology of events. Each is important and its individual merit should be emphasized as we today contemplate in retrospect on the progress of history and the influence of these various contributions on what is known at this time as modern medicine.

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CASE REPORT

ADENOCARCINOMA OF THE SWEAT GLANDS WITH METASTASES

A. E. BENJAMIN, M.D.

Minneapolis, Minnesota

MALIGNANT tumors of the sweat glands with metastases are rare. Gates, Warren and Warvi[1] reported thirty-five cases, four of them with metastases. The case I wish to report is one of interest because of the many areas and tissues involved and the associated lesions present.

Fig. 1. X-ray of the abdomen on August 11, 1943, before operation. The density in the right abdomen suggests a soft tissue mass. The operative findings showed that this was probably secondary to an intra-abdominal hemorrhage from a lesion in the liver.

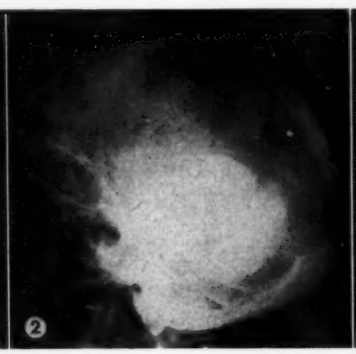

Fig. 2. Lateral view of the skull. The shadow of a dense tissue mass may be seen about the right ear, with erosion of the temporal bone about the mastoid and eburnation which was probably secondary to an infection in the tumor mass. Several nodules in the scalp could be seen in the original film but are lost in reproduction.

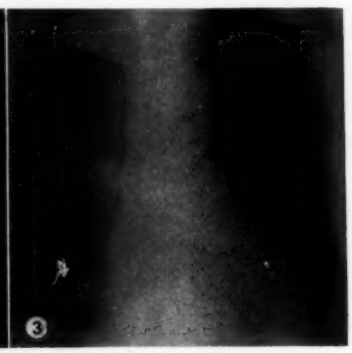

Fig. 3. X-ray of the chest on April 29, 1946, shows multiple rounded densities in the left lung which are most probably carcinomatous metastases.

Case Report

Mrs. C., aged 76, a widow for twenty years, was of Irish descent. She had had the ordinary diseases of childhood. Her tonsils had been removed in her earlier years. Twenty years ago, she noticed a skin tumor in front of the right ear. In two years time, this grew quite large, and she had it removed. Apparently it was malignant, for she had radium and x-ray treatments following the operation. Her father died of cancer of the mouth at seventy-nine years of age. Her mother died at twenty-four following childbirth. Mrs. C. was married at eighteen and at the time of examination had three grown children, all healthy. Another child, a daughter, died several years ago of tuberculosis. Her husband died of cancer of the mouth twenty years ago. Her menopause, when she was fifty, arrived with no particular disturbances.

When first seen by me in August, 1943, she complained of pain in the upper right quadrant. This pain had started one month previously. Her general health had been quite good. Her weight was 120 pounds; she was 5 feet 5 inches tall. She had worn glasses for about eight years. She stated she became somewhat deaf in her right ear fifteen years before, followed shortly by bilateral, nearly total deafness. She had been wearing a hearing aid since.

She had quite a large growth involving the external right ear and mastoid area, one involving the skin of the right breast, several growths on the scalp, and some on the arms, legs, and back, ranging in size from 1 to 5 cm. in diameter. These were dark in color and raised above the skin. She had upper and lower plates. Her mouth and throat seemed healthy. There was no thyroid disturbance. She had no cough or bronchial trouble. Her heart was normal. Her blood pressure was 140/72. There was no lymphatic enlargement. The liver was enlarged, the lower border extending 1.5 inches below the costal margin. There was pain upon percussion over the gall-bladder area and dullness over the upper right quadrant and some over the whole abdomen. She had a second degree prolapse of the uterus with a marked cystocele. She had no hernia. The bones and joints seemed normal. Her reflexes were normal. She had some varicose veins of the lower extremities. Her hemoglobin was 64 per cent. The urine contained a trace of albumin. Her bleeding time was 1 minute, 10 seconds; clotting time was 4 minutes. The blood Wassermann test was negative. Her temperature was 100; pulse, 78; white cell count, 11,800; and red cell count, 2,970,000.

The growths were thought to be malignant.

Read at the annual meeting of the Southern Minnesota Medical Association, Faribault, Minnesota, September 9, 1946.

Because of the severe pain in the upper right quadrant, a flat plate was taken, and a shadow in the vicinity of the gall bladder was noticed (Fig. 1). On August

Because of the continuous pain in the right upper quadrant and the possibility of a stone in the gall bladder, an exploratory operation was performed on

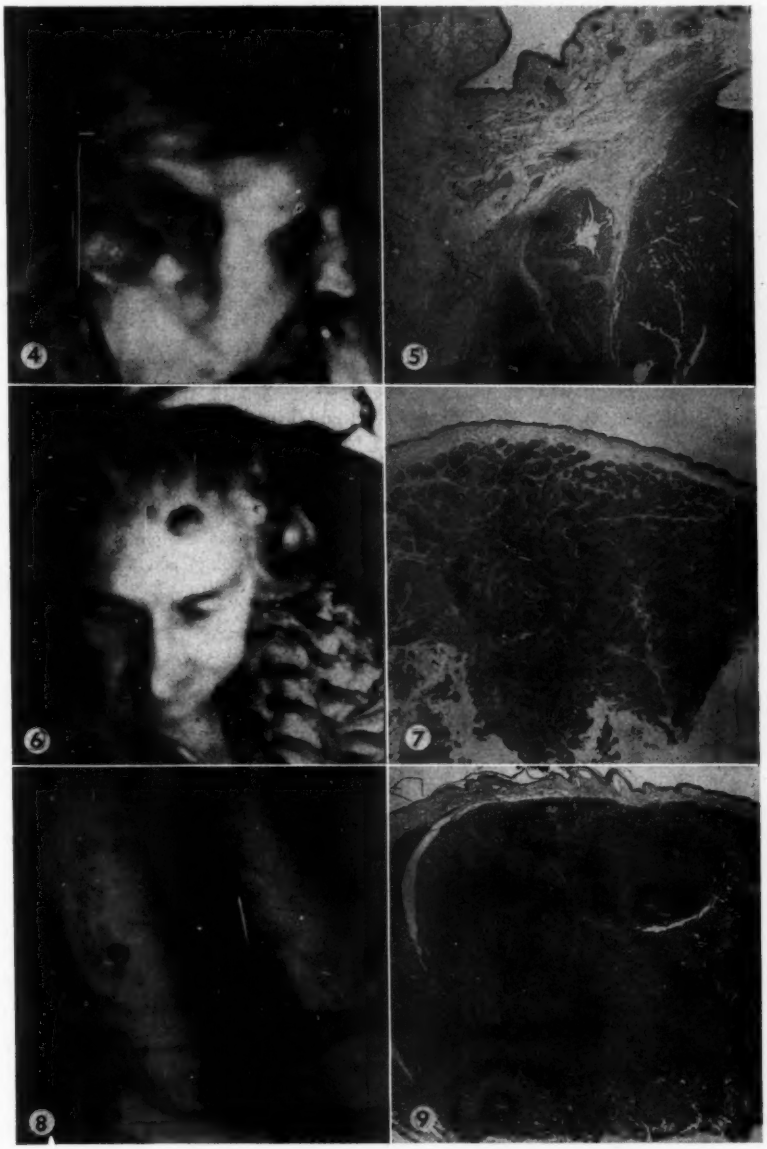

Fig. 4. Tumor of the right ear before operation.

Fig. 5. Photomicroscopic section of the right ear shows malignant degeneration of a cylindroma involving the ear.

Fig. 6. Malignant growth of the scalp and forehead before operation.

Fig. 7. Photomicroscopic section of a scalp cylindroma (turban tumor).

Fig. 8. Malignant growths on the legs before operation.

Fig. 9. Photomicroscopic section of a skin cylindroma with characteristic cytology.

12, 1943, three tumors were removed from the right lower leg, one from the right breast, and one from the forehead for biopsy. These involved the skin alone. The pathologist reported adenocarcinoma of the sweat gland type.

August 17, 1943, through the outer border of the right rectus. The muscle was retracted and the peritoneum opened back of the muscle. The abdominal cavity contained a great deal of blood from a hemorrhage that apparently had occurred from the under surface of the

liver, where there were a few greyish nodules. The omentum was adherent to the nodules and liver. The upper surface of the liver was smooth and the right lobe was enlarged. The organ was congested and inflamed. The gall bladder and other abdominal organs

Fig. 10. The patient after removal of the growth of the external right ear and the growths on her forehead and scalp.

were apparently normal, and no stone was found. The adhesions were separated and a portion of the border of the liver including a nodule was removed for biopsy. This was thought by the pathologist to be malignant, but the specimen was reviewed by Dr. E. T. Bell and others who believed it to be an angioma. A positive diagnosis was not made.

Transfusions were given following the operations. The patient made satisfactory progress. The bloody drainage gradually ceased and she was allowed to get up in a few days.

The patient did not require any special attention until April 22, 1946, when she returned complaining of pelvic distress and bleeding from the ear. She was weak and her hemoglobin was 40 per cent. The uterus was prolapsed and a cystocele was present. She had no growth or signs of malignancy in the pelvis. Appropriate diet and blood building remedies were employed. A pessary to support the bladder and uterus was fitted. The bleeding surface of the ear was treated. On April 29, 1946, x-rays were taken of the skull (Fig. 2) and lungs (Fig. 3). These showed invasion of the mastoid and possibly cancer of the lungs.

Because of the large and bleeding tumor of the ear (Fig. 4) which she had previously refused to have removed, we operated on May 2, 1946, removing all of the external ear and the contiguous tissue involved. The skull was not interfered with except to cauterize it, as we removed the malignant tissue by means of the electric knife. The pathologic report was basal cell carcinoma (Fig. 5).

Her progress was very satisfactory, and inasmuch as she seemed to improve after these various procedures, she and her family were anxious to have all remaining growths marring her appearance removed (Fig. 6). We then, on May 10, removed, under local anesthesia, three growths from the frontal region, one from between the shoulder blades, one from the left shoulder, and one from the lumbosacral region. The pathologist reported these growths to be basal cell carcinoma (Figs. 7 and 9).

There still remained the following smaller tumors; five growths on the lower left leg, seven on the right leg (Fig. 8), three more on the back, two on the scalp, and two on the upper right thigh. These we removed under local anesthesia five days later.

The wounds all healed perfectly (Fig. 10), and the patient seemed happy and well satisfied. There remained a little drooping of her right upper eyelid because of a nerve and muscle injury from the operation. The denuded area where the external ear was removed has now healed over, and she covers the defect with a lock of hair.

There remains, however, at this time, within the external auditory canal a small granular mass which probably is malignant, but which we will remove soon with the electric needle.

She weighs 126 pounds. Her hemoglobin remains about 70 per cent. Her general health is good, and she gets about alone.

Comment

This case is of particular interest because of the numerous growths and metastases which have occurred since she first noticed the tumor in front of her right ear twenty years ago. This tumor may have been the same malignant type of the sweat glands. There was no recurrence until a number of years later when it developed in the same location with involvement of the ear and skull, a tumor in the liver with hemorrhages, probable malignant growths in the lungs, and numerous malignant growths of the sweat glands of the scalp and skin of the body and extremities, these tumors being considered similar in nature by the pathologists. It is interesting to note that she has made improvement in a general way since all of these growths have been removed.

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I have never found a person who was merely a physical being. Most of us have minds and bodies and souls, and you can't treat just one part.—MARGARET S. TAYLOR, R.N., Congress on Rehabilitation of the Tuberculous, March 4, 1946.

NOTES ON THE HISTORY OF MEDICINE IN FILLMORE COUNTY PRIOR TO 1900

By NORA H. GUTHREY
Mayo Clinic
Rochester, Minnesota

(Continued from February issue)

A **Dr. Keller** settled in Preston around 1882 and for a few years practiced medicine and surgery there. It has been recalled by the daughter of an early settler, Mr. Joseph Pickett, of Carimona, that in her father's last illness one of her two physician uncles (Dr. William C. Pickett, founder of Carimona, and Dr. Horace W. Pickett) called Dr. Keller in consultation, and that Dr. Keller finally took the case alone.

Dr. Keller, although he possessed the confidence of many persons of judgment, physicians and laity, who believed him to be a skilled member of the medical profession, incurred the disfavor of others, as witness the following broadsides, the first of which appeared in the local *National Republican* in August, 1883:

> Quacks thrive by appropriating as their own the skill and knowledge of others. Dr. Love is one of the sufferers by this too common practice. The sap-head reporter of the *Lanesboro Journal* is doing what he can to give credit for service to others than those who perform it. When either Dr. Love or Dr. Knowles has an accouchement case, he hastens to report that Dr. Keller was the professional attendant. There are several such cases which exhibit the retailer of lies as a scavenger worthy of the dirt he consumes.

And the second appeared in November, 1883:

> Dr. Keller, the quack, who deluded so many Prestonians into the belief that he was an accomplished physician, and who left last fall to "follow his profession in Texas," is in Chicago trying to get a diploma from the Homeopathic Medical College. Will that relieve him from the necessity of borrowing some other physician's small hand?

A Dr. F. Keller practiced in Red Wing, Goodhue County, for a few years, perhaps more, in the seventies. There is official record, which should be considered with the foregoing paragraphs, that on April 24, 1884, Dr. Francis Keller, once of Goodhue County but "now Fillmore, as per certificate," a graduate from the Medical Department of the State University of Iowa, early in 1884, was licensed by the Medical Examining Board of the State of Minnesota to pursue the practice of medicine in the state, and that on March 2, 1885, he formally filed his license with the clerk of the District Court of Fillmore County, as required by law.

Ambitious to extend his scope of practice in a larger place, Dr. Keller left Preston in the eighties, and some years later word came back to the village that he had built up a large practice in Los Angeles.

Herbert Kendall, a graduate of Rush Medical College, was practicing medicine in Spring Valley in 1880, and in that year, at the annual meeting of the Minnesota State Medical Society which was held at Albert Lea on June 15, he was elected to membership in the association. Other mention of him has not been found.

William Nassau Kendrick was born at Athens, Leeds County, Ontario, Canada, on June 15, 1872, the son of Samuel Kendrick and Amelia McNish Kendrick, both of English parentage and natives of Oak Leaf, Ontario. Samuel Kendrick lived until 1903, his wife five years longer.

William Kendrick went to school in Athens, and subsequently was a student at the Almonte Collegiate Institute, at Almonte, Canada, from which he was graduated with honors in 1890, at the age of seventeen. Two years later, having decided to become a physician, he entered McGill University, from which he was graduated in 1896, again an honor student and the president of his class, with the degree of M.D. C.M.; among the awards for scholarship which he had received during his course of four years were the Primary Prize, the Prize for General Proficiency, and the Gold Medal for Proficiency in Chemistry.

Immediately after taking his degree in medicine, Dr. Kendrick came to Spring Valley, Minnesota, to join his half-brother, Dr. J. Ross Johnson, in practice, and on June 9, 1896, was licensed as a physician in the state. In Spring Valley, on October 14, 1896, he was married to Maud M. Lloyd, daughter of L. M. Lloyd of that place. In 1898 a second half-brother, Dr. Charles H. Johnson, of Austin, in neighboring Mower County, who was in ill health, persuaded Dr. Kendrick to become his partner; the association continued for eight years. During the period in Austin there were born to Dr. and Mrs. Kendrick two children, Dorothy Gertrude, on December 8, 1899, and William Lloyd, on March 16, 1903.

In 1905, after the death of his half-brother, Dr. J. Ross Johnson, Dr. Kendrick returned with his family to Spring Valley, where he spent the remaining thirty-one years of his life, a loved physician, high in the esteem and confidence of his patients and fellow townsmen. Among his professional contemporaries in the village were Dr. John D. Utley, Dr. Cyrus B. Eby and Dr. Eubert V. Simons, as well as others who were there for varying periods of time. These men and their fellow practitioners, in the late nineties and well after the turn of the century, experienced many of the difficulties and inconveniences that their earliest predecessors in medical practice had met; the scientific advances of the last two decades were then only visions in the minds of a few research workers.

Always a student, Dr. Kendrick did much postgraduate work, visiting clinics and hospitals, and twice taking courses at the Medical School of Northwestern University. He was a general practitioner, with special interest in diseases of the eye, ear, nose and throat, and he became well qualified in treatment for these disorders. An expert optician as well as an oculist, he fitted glasses for many of his patients. Dr. Kendrick early began to write occasional original articles for the medical journals, of which one of the first was a note on postpartum hemorrhage that was published in the *Northwestern Lancet* in 1898. He served on the local board of health and was a member of the local county medical society, the Minnesota Valley Medical Association, and the Southern Minnesota Medical Association (as stated previously, these two joined in 1911), and the state and the national medical associations.

Dr. Kendrick is recalled as a leader in every movement that had to do with the betterment of his community. He was a member of the Spring Valley Commercial Club, the Automobile Club, and the American Legion and of the following fraternal orders: the Masons (A. F. and A. M.; Grand Master of Minnesota in 1918); the Ancient Order of United Workmen, the Benevolent and Protective Order of Elks, the Modern Woodmen of America and the Modern Brotherhood of America. He was a Republican in politics, an Episcopalian in religious affiliation. During World War I he was an examiner of army recruits, local chairman of the Liberty Loan and Victory Drives, and he aided the national department of justice in locating hidden grain and in dealing with aliens. In October, 1918, he entered military service and was stationed at Camp Pike, Arkansas, until his honorable discharge on December 23, 1918. His favorite diversions, when time permitted, were hunting, fishing and golf.

Although Dr. Kendrick never fully recovered his health after an operation for ruptured appendix in 1912, and although he became the victim of agranulocytic angina, he continued in medical practice until his death, at Rochester, Minnesota, on January 21, 1936. He was survived by his wife, a son and a daughter, and a sister, Mrs. William McNaughton, of Ottawa, Canada. Three years later Mrs. Kendrick removed from Spring Valley to Brainerd where, until she died, on September 28, 1944, at the age of seventy-two years, she made her home with her daughter, Dorothy Gertrude (Mrs. E. C.) Parsons. Late in 1944 there were living of Dr. Kendrick's family, Mrs. Parsons, William Lloyd Kendrick, his son, a mining engineer at Coleraine, and three grandchildren.

Dr. Kendrick lives in the memory of all who knew him, distinguished for his professional ability and his personal integrity and worth.

Elling P. Kierland, who was born at Kjerland Homestead, Hardanger, Norway, on February 18, 1818, was educated in his native place, receiving his general grounding in the schools and his special training, in pharmacy and medicine, under a preceptor. As many another member of his family had done before him, he became a druggist and, although not a graduate of a medical school, a competent practitioner of medicine.

In 1839 Elling Kierland was married to Madli Hovlen, also a native of Hardanger, a religious, conscientious woman who was a fine wife and thrifty homemaker and a devoted mother to the seven children of the marriage. Dr. and Mrs. Kierland in 1856 came with their family to America, settling first on a farm in Winneshiek County, Iowa. After five years in Iowa they moved to Rushford, Minnesota, where Dr. Kierland operated a drug store with his sons, Thomas and Peter E. Kierland, the latter of whom subsequently became a physician in Rushford, a graduate of Rush Medical College in 1869.

In 1877 Dr. E. P. Kierland temporarily discontinued his practice of medicine to enter the hardware business with his son Louis in Canton, South Dakota, but on giving up this enterprise after a few years, he returned to Rushford where he resumed his preferred occupation. Not a graduate of a medical school, as has been stated, he had received excellent training and had improved his knowledge by study, as evidenced by his successful practice, so that on December 31, 1883, under the Medical Practice Act of that year, he received exemption certificate No. 733-3. Until the time of his death at the venerable age of ninety-four years he continued his work of caring for the sick.

Kind, generous, charitable, actively interested in the Lutheran Church and in civic affairs, Dr. Kierland was one of Rushford's most influential and upright citizens. He died on April 26, 1912, at Rushford, survived by three of his children, twelve grandchildren and ten great grandchildren. His family in 1943 was represented in the medical profession by three members: his grandsons, Dr. Peter Ernest Kierland (son of Thomas Kierland), of Alexandria, Minnesota, who for ten years was a physician of Harmony, Fillmore County, and Dr. George E. Hourn, of St. Louis, Missouri (son of Martha Kierland Hourn); and his great grandson, Dr. Robert Richard Kierland (son of Dr. Peter E. Kierland), of Rochester, Minnesota, since the entrance of the United States into World War II absent on military service. (Dr. Kierland returned to Rochester, where he is on the staff of the Mayo Clinic, in December, 1945.)

Peter E. Kierland, one of the seven children of Elling P. Kierland, pharmacist and medical practitioner, and Madli Hovlen Kierland, natives of Hardanger, Norway, was born in Hardanger in 1846 and when he was ten years old came with his parents and his brothers and sisters to America, to a farm home about ten miles east of Decorah, Iowa. Here in the country schools his education was continued. Early in the sixties the family moved to Rushford, Minnesota, where the boy, then fifteen, went to school and helped in the drug store which was operated by his father and his brother Thomas. Peter learned pharmacy from his father and, from 1862 to 1868, whenever time afforded, studied medicine under Dr. Billington, of Decorah, Iowa. At the end of that period he entered Rush Medical College, in Chicago, and from it was graduated on February 3, 1869, with honorable mention for high scholastic rating and with the degree of doctor of medicine.

The young physician, who is remembered as of medium build, with black hair and gray eyes, returned to Rushford to begin his professional life in the community in which the senior practicing physicians were his father, Dr. Thomas H. Everts and Dr. Henry C. Grover, and in which Dr. H. W. Eldred was a highly respected surgeon-dentist. Dr. Kierland was a Mason, a member of the Lutheran Church and from the first a useful citizen.

In Chicago Peter E. Kierland was married to Louise Anderson, and on his return to Rushford brought his wife home with him. Although she never had lived outside of a city, Mrs. Kierland entered fully into the life of the community and sought to share the hardships of a country doctor's routine, accompanying her husband in horse-drawn vehicles on many of his rural calls, regardless of weather. On one of these occasions, in the winter, when Dr. Kierland was to perform a surgical operation, a partial resection of the maxilla, the horse ran away and the cutter tipped over, spilling passengers, instruments and equipment in the snow. With neither his wife nor himself hurt, Dr. Kierland gathered up the paraphernalia and in due time carried out successfully the planned surgical procedure, which was followed by recovery of the patient.

In the second year of his practice, Dr. Kierland, whose fine intellect and scientific ability gave promise of great service to his community and to his profession, was stricken with pulmonary tuberculosis. In the hope that the journey and change of climate would prove beneficial, his father in 1870 took him to Norway but not long after their return to Rushford the young physician died, on Januarv 28. 1871. His death was announced in the *Journal of*

the American Medical Association: "He will not miss the haven of hope, with God at the helm."

Dr. Kierland was survived by his wife; their daughter and only child, Ella; his brothers, Thomas and Louis; and his sisters, Isabel Kierland Eide and Martha Kierland Hourn. Of that group, there were living in the early nineteen-forties only his daughter, Ella Dahl Kierland Rich, retired at Santa Monica, California, after a distinguished career as a concert pianist, and his brother, Thomas Kierland, ninety-two years of age (1943), who had retired some time previously after fifty-six years as a practicing pharmacist in Rushford.

E. J. Kingsbury, who was to become a well-known medical practitioner of southern Minnesota, was a native of New York State, born in Franklin County on August 23, 1832. When he was four years old the family moved to St. Lawrence County, where he grew up. He obtained his preliminary and academic education at a district school in Potsdam, at a select school in Raymondville and during six terms at the Raymondville Academy under Professor Montague. Thus prepared, at the age of eighteen years he began to study medicine under preceptors, the first instructor Herman A. Boland, of Raymondville, and the second, Dr. Goodrich, of Potsdam. He completed his medical training by attending lectures at the American Medical Institute at Cincinnati and he was graduated from that institution on March 14, 1854. Beginning his medical practice immediately in Oswego County, New York, he remained there until the autumn of 1855, when he traveled west to Minnesota Territory and settled in Mower County, pre-empting the southwest quarter of section 20, town 102, range 14, in the present Bennington Township. In fact, he assisted in the organization of the township and served as first chairman of the first board of supervisors. After a few years he moved, in the autumn of 1860, to the village of Spring Valley, in Fillmore County, where he remained in active medical practice for eight years. During this period there was occasional mention in county records of his having received fees for medical attendance on paupers.

In Spring Valley, if not immediately on his arrival, at least prior to 1865, he had his offices on Broadway, opposite the tinshop. A professional card in the *Preston Republican* of March 10, 1865, announced that E. J. Kingsbury and Brother—the first and only mention found of the brother—were physicians and surgeons, and a postscript set forth the following information:

> E. J. Kingsbury, having been appointed Examining Pension Surgeon by the Commissioner of Pensions, will attend to all applications for pensions with promptness and dispatch. They will also attend to the collection of back pay and Bounty.
>
> E. J. Kingsbury
> W. B. Kingsbury

Late in 1868 Dr. E. J. Kingsbury moved to Decorah, Iowa, where he remained until 1870, when he again settled in Mower County, in the village of LeRoy, which became his permanent home. The beginning of his practice there was coincident with an outbreak of diphtheria during which he served faithfully and with such success as to establish him in the confidence of the community. During his first year in Le Roy, Dr. Kingsbury was one of several reputable physicians of Iowa and Minnesota to endorse, in a notice in *Western Progress,* the newspaper of Spring Valley, one Dr. H. J. Stalker, mentioned earlier, apparently a dentist of merit who traveled about the region.

E. J. Kingsbury was married twice, the first time on July 3, 1853, to Lucia A. Angell, who was born at Pomfret, Vermont, on April 8, 1829. Mrs. Kingsbury died in Spring Valley, Minnesota, on September 28, 1867, leaving one child, Flora A. Kingsbury; an infant son had died a year earlier. Dr. Kingsbury's second marriage took place on October 21, 1868, to Mary G. Hard, who was born in Broome County, New York, on September 21, 1846. Of this marriage there were three children, Mattie J., Mildred A. and Elmer J. Kingsbury.

A strong advocate of temperance, E. J. Kingsbury from the age of seventeen years was a member of one temperance organization or another. That he was a man of active intellect and professional versatility was evidenced by the fact that he studied law and became a qualified member of the bar of Minnesota, admitted on April 6, 1882, to practice law in all courts in the state. In 1884 he had been serving for four years as police justice of Le Roy.

Dr. Kingsbury is said to have died in 1885, at the age of fifty-three years.

S. H. Knowles for a time in the early eighties was in Preston, Fillmore County, and in this period, on July 25, 1883, aged twenty-five years, he became a member of the Masonic Blue Lodge of the village: he did not withdraw from membership until 1899, although it is believed that he long had been gone from Preston.

In the local newspapers of 1883 there appeared items, always with approbation, concerning Dr. Knowles' professional services in cases of various types. And in the *Chatfield Democrat* of September 1, 1883, there appeared the following note: "Dr. S. H. Knowles has resigned his position as County Physician. Here is an opportunity for some enterprising doctor to travel over the county, administer to the sick and furnish medicine, all for $300 a year." Finally, on November 29, 1883, the *National Republican* of Preston had this to say:

> S. H. Knowles left Preston yesterday for Omaha where he has entered into partnership with Dr. J. C. Deinse, an old and successful practicing physician having an immense practice. Dr. Knowles will have charge of the general practice, for which he is well qualified. The future of this young physician will be mainly successful. Few, if any, young men in his profession have attained his experiences and knowledge of the literature of medicine and surgery. Preston has suffered a serious loss in his leaving. His friends gave him a reception in Hamre Hall on Monday evening.

For what it may signify in this account, it should be stated that Dr. Seth Knowles, a graduate of the College of Physicians and Surgeons, of Keokuk, Iowa, in 1878 (if this was S. H. Knowles, he was twenty years old), was licensed to practice medicine in Minnesota on August 18, 1884, receiving certificate No. 944 (R) under the "Diploma Law" of 1883. It should be noted also that many physicians, although they promptly secured their licenses under the new law, did not file them promptly. By 1890 Dr. Seth Knowles was residing in Minneapolis, according to the 1883-1890 official register of physicians of Minnesota; he died prior to 1909, presumably before 1907, since his name does not appear in the first issue (1906) of the Directory of the American Medical Association.

(To be continued in the April issue.)

President's Letter

MINNESOTA MEDICAL SERVICE, INC., TO BEGIN OPERATION SHORTLY

Minnesota Medical Service, Incorporated, a nonprofit corporation, has been born and is now a living, vibrant organization. It was initiated by the Minnesota State Medical Association, but there is no business connection between the two organizations. During the period of nascency, which lasted almost two years, the committee on organization of medical service worked diligently. It obtained information from many sources and it studied the plans of organization and operation of similar corporations in other states. By this method it hoped to utilize the features of value of other plans and sought to avoid the errors which others have made. Finally the committee prepared the articles of incorporation, the proposed contracts and the schedule of benefits. In addition to this, it prepared an agreement with the Blue Cross and secured pledges from the physicians of Minnesota in order to finance the enterprise. These pledges exceeded $100,000.

After this task was completed, the committee on organization made its report before a special meeting of the House of Delegates of the Minnesota State Medical Association on December 22, 1946. Immediately following the formal acceptance of the report by the House of Delegates, the Council was instructed to proceed with the formation of the corporation. Accordingly, the incorporators were selected by the Council and they were requested to deal with the details incident to the creation of Minnesota Medical Service. Within a few days the articles of incorporation were filed and accepted. The directors of the corporation and its officers have been elected, and the pledges are being honored in a most gratifying manner. It is predicted that the pledges already made will be redeemed, and probably many physicians who did not respond to the first call will seek an opportunity to participate. In fact, many have already done so.

During the discussions which took place in the special meeting of the House of Delegates just mentioned, it became apparent that some of the members believed that an indemnity plan probably would be more acceptable than a service plan in some communities. Therefore, a second resolution was proposed and adopted which provided that the Council should appoint a committee of five members which should act as a liaison between the State Association and the insurance companies in order to develop plans for the provision of low-cost medical insurance on as broad a basis as possible. This committee was appointed without delay, and a short time thereafter it met with representatives of insurance companies. A similar liaison committee then was appointed by the insurance group and these two committees have been proceeding with their work.

Within a short time, Minnesota Medical Service, Incorporated, will be ready to perform its function. By this means, physicians of Minnesota are attempting to bring a high quality of medical care and provisions for hospitalization to everyone. As physicians set themselves to this task, they are aware that other schemes with similar purposes may present themselves. Their attitude toward such developments is one of complete co-operation as long as such schemes fulfill the requirements of the principles of ethics of the practice of medicine. They realize that probably no single plan will solve the entire problem, but they hope that through the Minnesota Medical Service Plan, a useful purpose will be served in bringing the proper kind of medical care to the infirm.

A great responsibility rests with physicians. Those who gave up so much to serve their country in the recent conflict, as well as those who remained at home, have borne heavy burdens during recent years. It is hoped that these new arrangements will lighten their burden. The prospective importance of this plan, like that of all new ideas and new discoveries, cannot be exaggerated but until it is accepted and used, it can exercise no influence and therefore can work no good. Minnesota Medical Service, Incorporated, will need the care and the interest of every practicing physician. No one can afford to adopt the attitude of complacency or apathy. Of all evils, probably torpor is one of the most deadly. It blunts the faculties of men, withers their powers and prevents effective progress. Since progress depends on the energy of man, our alertness in support of this plan must not slacken. We must maintain that vigor of character, that decisiveness and that audacity, both of conception and execution which alone will pave the way to achievement.

Louis A. Buie

President, Minnesota State Medical Association

Editorial

CARL B. DRAKE, M.D., *Editor;* GEORGE EARL, M.D., HENRY L. ULRICH, M.D., *Associate Editors*

CALORIE INTAKE AND INDUSTRIAL OUTPUT

SCIENCE* has published a simple understandable report out of war-ridden Germany that teaches obvious nutritional lessons, especially the need of adequate protein in order to maintain weight when dietary fats have to be curtailed. Dr. David B. Dill of Harvard University (Industrial Physiology and J. M. Corps, U. S. Army) brought this report back in late 1945. There was an opportunity in Germany to appraise the unit output of workers in quite standardized employments, and to observe the effect of decreases or increases in terms of essential food retrenchments or supplements. Whereas it was possible to add mineral and vitamin supplements, these were of no avail in the absence of basic foods and total calories consumed.

Thus, workers moving earth for an embankment or mining coal (succumbing to German exactitude and complaisance) furnished the scientists with a chance to prove that "rationing of food also means a rationing of industrial production." No doubt that is the source of much trouble in Britain today, as well as in much of the devastated world. "Reconstruction is a problem of calories," according to this report.

Coal miners in training were alloted 1,200 calories daily, out of a total of 2,800, for "work." They handled seven tons of coal daily or used up 170 calories per ton. The researchers advised adding 400 calories per day, and the output went up to nine tons daily at a unit expenditure of 155 calories. But at this level the workers averaged a weight loss of 1.2 kilograms in a period of six weeks, and, of course, that could not be long maintained. So they boosted the intake 800 calories, after which ten tons of coal were mined daily and the weights of the workers returned to normal.

It will immediately occur to many to ask about morale, living conditions, individual degrees of ambition or lethargy. For example we are inclined to think that people living in temperate zones become tired and languid, like the natives, when they move to tropical climates. Against this evidence is the experience of Stillwell's engineers using weak and tired Chinese coolies and putting the famous road over the Hump. They were not capable of heavy work until they were fed more or less like football players, and then their accomplishment was prodigious. Commenting on what happened in Germany when food became scarce, the authors add, "Under existing conditions the job of one man often has to be done by two or three with a resultant higher total wage cost."

The amount of American production in peace and in war stems in great degree from well-fed workers. We have a munificent soil, a virile people, and to these have been added the power of the machine. Despite the sending of vast supplies of food ($300,000,000 worth to our portion of occupied Germany alone, and a prospective three-fourths of a billion demand to carry them through 1948), we seem to have inspired envy far more than a desire to emulate our capitalistic motivated economy. The solemn facts of food should be pounded into the heads of politicians and peace planners. A world interchange of food and goods is needed far in advance of a dissemination of cockeyed ideas of rights, privileges, or ideologies.

E.L.T.

*Kraut, H. A., and Muller (Dortmund, Germany): Calorie intake and industrial output, Science, 104:495, (Nov. 29) 1946.

USE OF DIMERCAPROL (BAL)

EVERY physician who administers any type of arsenical should familarize himself with a new potent detoxifying agent (BAL). This was a result of war research and was developed in England to combat the injurious effects of lewisite gas, hence, the name British anti-lewisite, which was abbreviated to BAL. This chemical is 2, 3-dimercaptopropanol, a dithiol derivative. It has been shown that arsenic interferes with the pyruvate oxidation process of the tissues by attaching itself to the -SH groups which are essential for this reaction. BAL has a greater affinity for arsenic than these groups and, therefore, releases them and forms stable non-toxic compounds which are easily eliminated by the body.

BAL is able to prevent toxic reactions and to reverse the process if the tissue cells are not yet dead.

BAL is indicated in all toxic arsenical reactions such as neutralizing arsenical vesicant agents which come in contact with the skin or mucous membranes. Eagle* found marked relief and rapid improvement in the majority of cases of arsenical dermatitis in which BAL was used. It was a life-saving measure in toxic encephalitis and was beneficial in arsenical agranulocytosis, aplastic anemia, hepatitis, and accidental arsenic overdosage.

BAL is usually administered intramuscularly and, in the severe complications resulting from arsenic administration, the dosage found to be best suited is 3mg. per kg. This amount is given every four hours for twelve injections, then four injections are given on the third day, followed by injections twice daily until ten days have elapsed or complete recovery ensues. In less severe reactions, the amount given is 2.5 mgs. per kg. and, after the third day, only one to two injections a day, as indicated.

The reactions to BAL include nausea, vomiting, headache, burning of the mouth, throat and eyes, pain in the jaws, lacrimation and salivation, a constricted feeling of the throat and chest, and burning and tingling of the arms and legs. These occur about fifteen to twenty minutes after administration of the drug. Barbiturates seem to relieve these reactions and, if persistent, the dosage should be reduced.

Some investigators† have found BAL effective in heavy metal poisonings occurring from mercury, bismuth, gold, cadmium, zinc and lead. Its usage in these instances requires further study, and the exact methods of treatment are not yet available.

F. T. Becker, M.D.

VAGOTOMY FOR PEPTIC ULCER

WHATEVER the cause of peptic ulcer, the acid gastric secretion is generally accepted as being the main factor which prevents healing.

The main purpose of medical treatment of peptic ulcer is the constant neutralization of the acid gastric juice by frequent feedings and alkalis. This can be accomplished comparatively easily during waking hours but is well nigh impossible during the night. This is a distinct disadvantage, for a characteristic of the stomach in the presence of a peptic ulcer is that it secretes an abnormally large amount of gastric juice and possesses an increased motility during the fasting period.

It has been known since Pavlov's original experiments that the vagus is concerned with gastric secretion. A stomach isolated from the esophagus and duodenum by transection of the lower esophagus and duodenum, but with the vagus supply intact, will continue to secrete gastric juices. Section of the vagus fibres supplying the isolated stomach will result in a marked diminution in the quantity and acidity of the gastric secretion.

Dragstedt, recognizing this fact, was the first to propose and institute vagotomy in the treatment of peptic ulcer. His reports have stimulated others to follow his lead, and several hundred vagotomies have now been performed.

In Dragstedt's original operation, the transthoracic approach was used, the seventh or eighth left rib being resected. It was felt that only by this approach could the operator be sure of identifying and severing all of the vagus fibres which lie on the lower esophagus and are irregular in their course. Later he found that, with the abdominal approach, the terminal esophagus could be freed and retracted several centimeters, to make the right and left and communicating fibres accessible. The advantage of the abdominal approach is that the site of the ulcer can be inspected, and additional operative procedures can be undertaken at the same time if indicated. For, vagotomy alone is frequently not the cure for peptic ulcer. While it generally lowers stomach secretion and acidity and lessens motility, it not infrequently is followed by gastric stasis which requires constant gastric suction for one or more days following operation. If the ulcer has produced some narrowing of the pyloric outlet, a gastroenterostomy may also be required.

It is too early to make a fair appraisal of vagotomy in the treatment of peptic ulcer. Whether it is or is not the long-sought ideal operation for the surgical treatment of the disease cannot be stated. Certainly it is not indicated for every peptic ulcer. So-called medical treatment is highly satisfactory for most patients who are willing to co-operate in the matter of dieting, taking al-

*Eagle, H.: The Systemic Treatment of Arsenic Poisoning with BAL. J. Ven. Dis. Inform., 27:114, 1946.
†J. Clin. Investigation, July, 1946.

kalis, and abstaining from coffee, alcohol and nicotine. Gastroenterostomy has relieved many a patient with recurrent ulcer and/or pyloric obstruction, although the incidence of resulting gastrojejunal ulcer is fairly high. Subtotal gastrectomy for recurrent and bleeding ulcer has proved fairly successful in the hands of a few surgeons but seems a rather formidable procedure.

Vagotomy is apparently making a place for itself in the treatment of peptic ulcer. Perhaps it is particularly indicated in young individuals who, for one reason or another, do not respond to medical treatment and in whom hypersecretion of gastric juice is a prominent factor. Possibly it has a place along with gastroenterostomy. Until, however, indications for its use are more clear-cut, and long-time results of the operation have been observed, the members of the profession should not become too overenthusiastic in recommending it to their ulcer patients.

THE NURSING PROBLEM

THE great scarcity of registered nurses presents a problem dangerous and tragic to the hospitals, physicians and the public, both in urban and rural areas. The situation is truly alarming because it is certain to become much worse before it is better, as the supply of nurses is rapidly diminishing while the demand is increasing, chiefly because of the civil hospital expansion program and the vast construction for veterans.

The plain fact is that girls are not entering the nurses' training course as offered in our city hospitals. There are several elements entering into this situation. The ease with which high school graduates at present can secure satisfactory employment with little or no special training, and the proportional poor pay for well-trained nurses are two elements which are the result of war economy and will adjust themselves.

We in the rural areas are convinced that the chief element, which will not adjust itself, is the unnecessary costs and other demands made upon the girls in the courses offered in the cities today. We feel we have good grounds for criticism, as some years ago there were three-year nurses' training courses in many rural hospitals, two years spent at home and one year in a large city hospital, an arrangement which prepared excellent nurses in adequate supply. They proved themselves excellent because they were in great demand, both in the affiliate city hospitals and the country; also, the State Board examinations proved they were well grounded in the fundamentals as their average standing was high—very rarely did one fail. This desirable and successful arrangement was abitrarily terminated by some authority at the top. Some may say this was in the past but cannot be a success today. Facts prove the contrary.

In Minnesota we have three rural hospitals which have been able to carry on under the affiliation plan because of the consideration given them by the Sisters at St. Mary's Hospital in Duluth. These hospitals have more applicants than they can take, whereas most of the city hospitals have far less than half their needs. I can speak with first-hand knowledge concerning St. Francis Hospital, Breckenridge, a neighboring town. Sister Elizabeth tells me she regrets exceedingly that she is unable to take all her desirable applicants.

There are two chief reasons why the rural hospital courses are successful:

1. They are out where the desirable girls grow.

2. The courses are so arranged that the girls can earn their own way, aside from a few incidentals. Here a poor girl has an equal chance with those who have the means, resulting in better nurses.

The present plan of giving a one-year course for practical nurses and licensing them will help in certain ways, but does not meet the great need for more graduate nurses. We feel there is a solution to the pressing problem, namely, the establishment of nurses' training courses in properly equipped rural hospitals, with one-year affiliation in the large city hospital.

This is a plan that has succeeded and is now succeeding where given a chance. Why not push this plan through before the situation becomes hopeless?

W. L. BURNAP, M.D.

Read before the National Conference on Rural Health at the Palmer House, Chicago, February 8, 1947.

Many a maternity patient has received obstetric care in its most literal sense—that is, care which is focused only on her reproductive organs—and died from tuberculosis or diabetes or cancer soon after delivery.—HAZEL CORBIN, R.N., J. Nursing, (Aug.) 1946.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association
George Earl, M.D., Chairman

1947 NATIONAL HEALTH BILL

On February 10, the National Health Bill of 1947 was introduced to the Eightieth Congress as S. 545. This bill, sponsored by Republican Senators Taft of Ohio, Smith of New Jersey, Ball of Minnesota, and Donnell of Missouri, is a revised version of last year's Taft-Smith-Ball Bill, introduced toward the close of the Seventy-ninth Congress as an alternative to the Wagner-Murray-Dingell measure.

The 1947 National Health Bill is a great improvement over the former measure. New provisions have been added, and the basic philosophy behind the measure has been clarified. Helpful suggestions from members of the health, medical, hospital and dental professions, both those inside and outside of government circles, are responsible for much of this improvement.

Representatives of the American Medical Association met with Senators Taft, Ball and Smith on December 27; the following day, delegates from the New York Academy of Medicine and from the New Jersey State Medical Society met with Taft, Ball, Smith and Donnell. Representatives of the American Dental Association talked with Taft on January 7.

Bill Clearly Indicates Revenue Source

One aspect of S. 545 which should please doctors of medicine throughout the country is the definite provision in Section 307 of the bill, for an appropriation of funds from current revenues to carry out the program which the bill sets up. Section 307 was written into the bill largely at the instigation of Senator Donnell, who is a firm believer in financing from current revenues, as opposed to bond issues. Many have felt with Senator Donnell that the government has too long authorized appropriations without concern as to where the money is to come from.

A brief look at S. 545 reveals the following general provisions: (1) a grant of $200,000,000 a year to states on a population basis for medical care, chiefly to low-income patients, (2) establishment of a new and independent national health agency to handle all the federal government's health activities, (3) distribution of money for dental care with 8 million proposed for the first year and larger amounts each successive year up to 20 million the fourth year, (4) $10,000,000 for cancer control through the financing of diagnostic centers in the states, and (5) periodical medical examinations of all children in public, non-public, primary and secondary schools.

Measure to "Fill Gaps in Medical Service"

In a public statement made when he introduced his bill, Senator Taft said: "The bill we are proposing proceeds on the theory that the United States already had a comprehensive medical service as good as any in the world, but there are gaps in the service, particularly in reaching the lower income groups."

The Taft-Smith-Ball-Donnell Bill has been referred to the Committee on Labor and Public Welfare, of which Senator Taft is chairman, and Senators Ball, Smith and Donnell are members.

An important feature of S. 545 is its proposal to co-ordinate all health activities of the federal government into one independent agency. There is on foot in Washington a movement to put over another bill, which would create a health agency, but would place it in a subordinate position. This bill would set up a Welfare Department, give its head cabinet rank, and place under him three undersecretaries, one to manage health activities, one to take charge of welfare and social security and one to concern himself primarily with education.

Welfare Department vs. Health Agency

A complete analysis of the question of a three-cornered Welfare Department versus an Independent Health Agency has been made by Dr. Marjorie Shearon (Ph.D.), a non-partisan Washington research analyst.

The crux of the question, as Dr. Shearon sees it, is this: Does American Medicine want a third

party between it and the President? If the top civilian medical and health officer were an undersecretary, she points out, that would mean he must discuss health and medical programs, legislation and policies with the President through an intermediary—someone, perhaps, from the welfare or social insurance fields.

In a recent issue of her regular Bulletin, "American Medicine and the Political Scene," which she authors in connection with her work as consultant on social legislation for Republican members of the Senate, Dr. Shearon discusses the question fully.

"An independent health agency has great merit," Dr. Shearon maintains. She explains that: (1) it would be founded on law, not created by order of the President; (2) it would be headed by a physician; (3) it would have its own funds from Congress, so that its director would not have to go "hat in hand" to a lay administrator annually for approval of his budget; and (4) it would be separated completely from the aggressive, autocratic Federal Security Agency in which the Social Security Administration is the dominant unit.

Political considerations aside, and speaking only for herself, on the basis of her observations, Dr. Shearon predicts that an undersecretary of health could easily become "only an also-ran," even though he might be an outstanding medical man.

Government "in Medical Picture to Stay"

"The Federal Government is in the medical picture to stay," Dr. Shearon declares. "It is up to American Medicine to determine whether its position in the family of federal agencies is to be strong or weak."

Dr. Shearon stresses the need for separation of health and medical functions from the control of the Federal Security Agency, calling this separation "the most important single objective to be sought at this time." The Taft-Smith-Ball-Donnell Bill calls for such a separation when it creates an independent health agency, responsible to the President and headed by an outstanding physician—thus it offers a way to protect highly technical health and medical functions of the Federal Government from lay control.

According to Dr. Shearon, Labor regards the Social Security Administration as its own agency —and so long as health and medical functions are a component part of a dominantly welfare-security agency, whether it be the Federal Security Administration or a Department of Health, Education and Security, Dr. Shearon warns that "American Medicine will face the triple threat of welfare workers, social insurance groups and organized Labor."

Grant of $4,119,800 Proposed for Minnesota

Minnesota's share of the $200,000,000 allotment proposed by the National Health Bill of 1947 would be $4,119,800. This money, in accordance with the underlying principles of the bill, represents aid to this and every other state to develop their own health and medical, hospital and dental services to low-income groups.

So that public money will be spent where most needed, part of each state's allocation is to be spent for a survey of resources in the fields covered by the bill. Participating states will be expected to develop comprehensive programs during a five-year period. Voluntary methods are encouraged through the provision for use of funds for at least partial payment of premiums for persons unable to pay in full for their own voluntary insurance.

The re-introduction in the Eightieth Congress of the storm-provoking Wagner-Murray-Dingell Bill of last year by Senator Murray of Montana promises a new fight between the proponents of compulsory health insurance as recommended by President Truman, and those who believe in the use of voluntary means for distributing medical services. A showdown is expected in the Senate Labor and Public Welfare committee, to which both the Taft-Smith-Ball-Donnell Bill and the reissued Wagner-Murray-Dingell Bill have been referred.

MINNESOTA HEALTH LEGISLATION

Health in Minnesota is getting its share of attention in the 1947 Legislature, and the hoppers contain several measures aimed at correcting and improving substandard conditions in certain areas, some of which have existed a long time.

For one example—all Minnesota communities that want full-time local health officers and other health personnel shall have them, providing a bill now under study by the legislators gets their ultimate approval. This bill will enable local governments to set up their own health departments or to pool their resources with those of adjacent counties and municipalities to form joint health departments.

Figures recently published in a State Department of Health bulletin, point to a need for just such a bill as this. Minnesota, the bulletin says, has been spending around 42 cents a year for each person for health services, an amount far from adequate to fill the health needs of the people. Considering that the majority of this sum is spent in urban areas of the state, at least a million people must do without their share of preventive health services.

Minnesota's 42-cent rate is one of the lowest in the United States, the average for the forty-eight states being about 61 cents per person annually—or 19 cents higher than the amount spent in Minnesota. The Department of Health says that about $1.00 per year per person is needed to provide even minimum health services.

Minnesota Late in Establishing County Health Departments

Minnesota is quite far down the line of states to formulate permissive legislation for the establishment of local health services; if the measure passes, it will be the forty-second state to take this step. A committee, known as the Minnesota Committee on Local Health Services, formed in 1945 and including representatives of many organizations—the State Medical, Dental and Nursing Associations, labor and farm groups, co-operatives, the PTA, the League of Women Voters, the Federation of Women's Clubs and others—has been at work since December, 1946, formulating basic principles to be embodied in a measure for submission to the 1947 Legislature.

That is the history behind Senate File No. 27, introduced by Senators Wright, Wahlstrand and Burdick, which provides for the appointment of full-time health officers and sharing of expense between participating counties on a population basis, and permits financing by federal, state and county funds, and private gifts.

The Wright-Wahlstrand-Burdick Bill, after its introduction, was referred to the Public Health Committees of the House and Senate. Already reported on favorably by the Senate Committee, the bill is due to be reported on shortly by the House Committee.

Seek Aid for Public Health Nurses

A measure to provide partial financial support for every county which hires a public health nurse is now before the Legislature and has been approved by the House of Representatives. It provides an annual grant to counties for public health nursing services, payment of which is to be made in quarterly installments.

A request for increased appropriations for state mental institutions, aimed at making the "purely custodial institution" a thing of the past in Minnesota is also being discussed by the lawmakers. The bill would increase facilities of our present institutions to provide more adequate treatment for mental patients in addition to supervision and care.

CANCER FIGHT INTENSIFIED

Minnesota's proposed allotment in the 1947 appropriation of $2,500,000 from the federal government for cancer control work is $52,665. With these funds and those collected by the Minnesota Cancer Society, the fight against cancer here in Minnesota, where over 4,000 lives were claimed by this disease last year, is growing ever more intense.

An alert State Cancer Committee, consisting of Dr. A. H. Wells of Duluth, chairman, and Drs. D. P. Anderson, Jr., Herbert Boysen, E. C. Hartley, J. A. Johnson, J. F. Karn, F. H. Magney, W. C. McCarty, Sr., Martin Nordland, W. A. O'Brien and W. T. Peyton, is expanding its already active educational program. Several conferences have been held for doctors, including clinics and demonstrations of newer methods for earlier diagnosis; for public health nurses, emphasizing methods of case-finding and follow-up care; and for lay leaders, presenting lectures on the nature of cancer, its cure and prevention, aimed at dispelling fear and spreading knowledge of the disease.

At the physicians' conference held on the campus of the University of Minnesota January 2, 3, and 4, a total of 125 doctors from Minnesota, North Dakota and South Dakota attended. Lay leaders attended a conference there January 23, 24, and 25.

Additional Conferences Scheduled

Conferences are scheduled for Duluth on March 18 and 20 and for Worthington on March 25. At future dates, it is planned to hold conferences in nine other sections of the state.

Through the Cancer Committee's arrangements, the Minnesota Cancer Society recently sent out

to state physicians a booklet containing thirteen issues of the *Cancer Bulletin*, prepared by the American Cancer Society and containing articles, authored by specialists in the field, covering the latest-discovered facts about cancer, as it attacks various parts of the body, the lungs, the stomach, the bladder, the genito-urinary tract, et cetera. Starting about September, a series of monthly supplementary bulletins containing later information, which can be added to the booklet, will be sent to the doctors.

In line with recent action taken by a joint committee of the American Medical Association and the National Education Association to encourage the inclusion of a study of cancer in the nation's high schools, "A Revised Study Outline on Cancer for Secondary Schools" was prepared by the Minnesota Cancer Society and has been distributed to teachers in all public and private schools in the state.

Pamphlet Contains Cancer Facts

At its last session, the House of Delegates of the American Medical Association instructed the Council on Medical Service to make a survey of the ways in which funds for cancer control work are being utilized by the various state and county medical societies. Funds available are those provided by the federal government, distributed through the state departments of health and those coming from the American Cancer Society which are utilized by State Committees on Cancer. The American Medical Association wants to make sure that these funds are administered wisely with the co-operation of the practicing physician.

VETERANS MEDICAL SERVICE

With a little over half of the physicians in the state having returned their enrollment cards, making them participating physicians in the Minnesota Veterans Medical Service, this division of the State Association officially began operations, under Part I of the Uniform Fee Schedule, on February 10.

Already, a total of 500 authorizations for medical service to veterans have been received by the division from the Veterans Administration. Most of these have been authorizations for treatment, and some have been for physical examinations.

In a complex program of this kind, the beginnings are fraught with details and routines that must be worked out until each cog of the machinery is adjusted to work smoothly. Especially at this beginning stage, the doctors who are struggling through the rolls of red tape while trying to give the best possible service to the veteran, are turning in reports of services rendered, which in a few cases are not quite up to the requirements of the Veterans Administration. In these cases the VMS must write and ask the doctor for additional information. As the program progresses, of course, and doctors become accustomed to submitting these reports, there will be less and less of this difficulty. And it is assured, with the co-operation of the medical profession of this state, the VMS will not only satisfy the needs of the veteran but will also conform to government requirements.

ACUTE INTUSSUSCEPTION

(Continued from Page 260)

Summary

1. Fifty-six patients upon whom fifty-eight operations were done for acute intussusception were studied.

2. The cardinal symptoms were found to be intermittent colicky pain, vomiting and bloody stool. These were present in 73 per cent of the cases.

3. The best results were obtained where early diagnosis was made and early treatment instituted.

4. Close co-operation between the pediatrician and the surgeon is essential.

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Minnesota Academy of Medicine

Meeting of November 13, 1946

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, November 13, 1946. Dinner was served at 7 o'clock, and the meeting was called to order at 8:15 by the president, Dr. S. E. Sweitzer.

There were fifty members and three visitors present.

Minutes of the October meeting were read and approved.

Upon ballot the following were elected as candidates for membership in the Academy: *University:* Drs. Donald Hastings and Leslie Spink; *Saint Paul:* Drs. Edward Burch and Jerome Hilger; *Minneapolis:* Drs. Ralph Creighton, Vernon Hart, Douglas Head, Stanley Maxeiner, and William Rucker.

The scientific program followed.

PERIARTERITIS NODOSUM—TREATMENT WITH PENICILLIN

S. MARX WHITE, M.D.
Minneapolis, Minnesota

Rich states that it has for some time been suspected that there may be a basic factor common to rheumatic fever, periarteritis nodosa, Henoch's and Schonlein's purpura, rheumatoid arthritis, lupus erythematosus, and quite probably some instances of glomerulonephritis. He further indicates that there are now many reasons for believing that all of these conditions may represent the effects of vascular and collagen injury caused by sensitization to a variety of different antigens. As a result of experimental study, Rich and Gregory report that typical diffuse periarteritis nodosa has been produced by establishing in rabbits a condition analogous to serum sickness in man and that the condition is one manifestation of the anaphylactic type of hypersensitivity. In previous papers they had presented clinical and pathological evidence that periarteritis nodosa has developed in patients as a result of hypersensitive reactions following foreign serum and sulfonamide therapy. As a result of their work, they state that the continued administration of foreign serum or sulfonamides after a hypersensitive reaction has occurred, or the injury of a single large amount of foreign serum, increases the danger of producing the vascular damage by prolonging the contact of the sensitized body with the offending antigen. As collateral evidence for the concept that vascular damage can be produced through hypersensitivity, they report that acute diffuse glomerulonephritis occurred in a number of the animals that developed a hypersensitive reaction to the foreign serum.

Much supportive information has been secured in recent years, an example of which is furnished by Wilson and Alexander. They report that in 300 consecutive cases of periarteritis nodosa, bronchial asthma was identified in fifty-four, or 18 per cent. Occasional apparent success in the treatment of severe asthma with bronchitis led to the suggestion that some effect might be produced by penicillin in the treatment of the case of periarteritis nodosa under discussion.

Case History

Mrs. M. P., aged seventy-three, was admitted to Eitel Hospital May 31, 1945. She was a widow, mother of three married children, one of them a surgeon in New York City. Her medical history is rich in modernistic medical and surgical procedures. The significant items include:

1. In 1936 a diagnosis was made of hypopituitarism and hypothyroidism with localized patches of a form of scleroderma. Basal metabolic rates quite uniformly in the neighborhood of minus 29 per cent; thyroid administration; also amniotin was used over a period of many months.

2. In November, 1936, uterine curettings secured because of post-menstrual bleeding showed senile endometrium with very thick-walled vessels but no evidence of malignancy.

3. In 1939, there was a diagnosis of anxiety neurosis with uterine prolapse.

4. The 1940 records show continued use of thyroid substance with basal metabolic levels between minus 5 and minus 10 per cent. In October, 1940, the labia majora and minora were excised. Microscopic examination showed marked atrophy of epithelium to the point of ulceration, subcutaneous tissues showing hyaline degeneration and round cell infiltration. A diagnosis of kraurosis vulvae was made. Postmenstrual bleeding from the uterus again indicated dilatation and curettage but the curettings showed no malignant changes.

5. In 1943, there were mild arthritic manifestations in the right knee and right index finger. The scleroderma became reactivated in the perineal region and stilbesterol, which she had been taking in minimal doses, was increased to 1 mgm. every three days.

She was admitted to Eitel Hospital on May 31, 1945, with a history of sudden onset May 28 with malaise, chills, vague body aches and pains. Following this, there was recurring chilliness and headache with fatigue. The day before admission she had difficulty in opening the mouth, with tenderness over the temporomandibular regions. There was no cough or dysuria. Examination in brief: She appeared moderately ill. There was definite swelling and tenderness of the parotid region on the left extending well below the angle of the mandible. On the right there was some swelling but less than on the left. The lungs were clear except for harsh breath sounds at the angle of the left scapula. The heart was negative except for frequent premature beats followed by compensatory pause. Blood pressure was 114/55. Electrocardiograms showed normal complexes with frequent extrasystoles from a single ventricular focus.

No rash was noted on the skin. The patellar and ankle reflexes were hyperactive but equal and normal. There was no rigidity of the neck or extremities. The impression was recorded that she had an epidemic parotitis and she was isolated.

However, with prompt subsidence of the local symptoms, daily temperatures rose to a maximum of 102.8° F.

at 4 to 8 p.m., with morning records of 99° to 100°. Occasional chilliness was noted when temperatures rose.

With persistence of the fever, studies were instituted. The urine was persistently negative. Leukocyte counts of 12,300 to 15,500 were recorded up to June 11. Myelocytes of all types constituted about 5 per cent of the leukocytes, and occasional plasma cells and leukoblasts were seen, but no myeloblasts. Heterophile antibody agglutination was atypical at 1:10 dilution. Agglutination with typhoid group and Brucella melitensis was negative.

Bone marrow biopsy, June 16, was reported by Dr. R. H. Reiff as showing neutrophilic hyperplasia of the marrow with inflammatory changes. The sedimentation rate of the red blood cells was 66 mm. in one hour.

X-ray studies showed no parenchymatous involvement in the lungs except a typical calcified Ghon tubercle in the lower left lung field. Minimal changes were noted on the vertebrae with calcifications on the walls of the aorta. There are minimal hypertrophic changes at the intervertebral joints and of the fingers.

On June 7, pain in both temporal regions was noted and there was very slight edema of the right temporal region, but nothing more than moderate tortuosity and diffuse thickening of the temporal arteries could be made out. The pain in the left parotid region was definitely diminished.

Ophthalmoscopic examination showed only sclerosis of retinal vessels consistent with her age.

On June 10, Dr. B. H. Morris noted complaint of pain in the right wrist with no local signs. Also noted—"Feels pain along the course of arm and leg veins," but there was no enlargement or tenderness over their course.

By June 18 and 19, there had been a period of lessened temperature, beginning June 16 with maxima of 100° F., and she was eating better, sitting up more, and seemed better in every way. There had been no specific therapy to which this could be assigned. At this moment she developed a throbbing pain in the right thumb with an area of swelling and redness on the radial aspect adjacent to the thumb nail and an area of redness and induration appeared on the skin lateral to the left breast. This area was about 1 cm. broad and 5 cm. long. It followed a course downward and toward the median line such as would be typical of a small superficial artery. The area was not particularly tender although the breasts were very tender and there was a general hypersensitivity both of skin and muscles. By this time, repeated blood cultures were still showing no growth (and none appeared at any time later).

On June 27 biopsy material was secured from the skin lesion and from the left deltoid muscle. Microscopic report by Dr. R. W. Koucky: The deltoid region showed no vascular lesions. The characteristic change was seen only in the subcutaneous tissue. The process affected the small arteries and an occasional arteriole. These small arteries showed thrombosis and marked thickening of the subintimal layer. All of the muscle and periarterial zone was overgrown by young fibroblasts. There was heavy, diffuse infiltration of polymorphonuclears. There were syncitial masses like malformed giant cells. The picture was typical throughout of periarteritis nodosum with the exception that the heavy eosinophilia customarily seen was absent in this case. Conclusion: Periarteritis nodosum. (Slides shown)

On the day of admission, May 31, 1945, penicillin intramuscularly had been started by a penicillin-conscious assistant but was discontinued after thirty doses at three-hour intervals and a total of 600,000 units. No effect on the fever or symptoms was noted at this time.

Following the diagnosis of periarteritis and despite the indications apparently unfavorable to its use, penicillin intramuscularly was again begun on June 28. Daily amounts of 160,000 units was given over a period of twenty-one days to July 19, with a total of 1,920,000 units. During the first fourteen days of penicillin therapy temperature rises to 103° F. continued. Then there followed prompt abatement but only to 100° and 101° F. maxima until discontinuance on July 19. During the week of July 20-27, on two occasions only, records up to 101.6° were noted, and after this time to August 19, i.e., one month, temperatures up to 100° F. were occasionally recorded. From then on to discharge on September 6 the temperature was normal, and she gradually gained in strength and capacity.

During the period of penicillin administration, transfusions from Rh negative donors were given on three occasions in amounts of 300 c.c. each, with no reactions. Hemoglobin values around 75 per cent remained essentially unchanged. When seen after discharged, on October 2, 1945, the hemoglobin was 75 per cent, red cells 3,200,000, and leukocytes 11,400.

The winter of 1945-1946 was spent in California. While there she had a relapse, the story being strongly suggestive of her old trouble outlined above. In the account of this illness, she reports that on her insistence penicillin and five transfusions were again used with slow recovery. A letter from Dr. William H. Leake, Beverly Hills, California, may be quoted as follows: "Your patient, Mrs. M. P., was under treatment at Hollywood-Presbyterian Hospital between May 4 and June 21, 1946. She received five whole blood transfusions of 300-350 c.c. each on the following dates: May 13, 14, 16, 21, and 29. Over an eleven-day period, May 10 to May 21, 700,000 units of penicillin were administered. Shortly after this treatment was instituted definite improvement was noted in the patient's condition."

She was readmitted to Eitel Hospital on October 3, 1946. She complained of the same vague pains but had no skin eruptions and no localizing symptoms. There was much headache which she insisted was similar to that she had had during her previous hospital stay. There was extreme weakness, and she continually insisted that her symptoms were identical with those of 1945 and with those during her hospitalization in California in the winter of 1945-46. She was insistent that penicillin and transfusions be tried. During her stay no rise in temperature was recorded. The blood pressure was 120/80, weight 144 pounds; general physical examination negative.

On October 4 her hemoglobin was 80 per cent (13.3 grams) with a leukocyte count of 6,000. On October 8, hemoglobin 88 per cent (14.7 grams) with red count of 4,680,000; and October 10, hemoglobin 85 per cent, red count 4,450,000, and leukocytes 6,850. Examination of the urine gave negative findings.

Penicillin in doses of 25,000 units intramuscularly at three-hour intervals up to and including October 15 was given to a total of 2,500,000 units. She was given transfusions of 250 c.c. of blood on October 7 and October 12.

During the hospital stay her headaches disappeared, vague pains no longer were troublesome, and she improved in strength and well-being at a moderate rate so that on the date of discharge, October 15, 1946, she was feeling well, walking about and said that she had improved very greatly. She has remained well and is going about quite regularly.

It should be stated here that she has not been on thyroid or estrogen therapy for nearly two years. No identifiable allergen has been found in her case.

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Discussion

DR. A. R. HALL, Saint Paul: This is an interesting contribution. Dr. White reports a case of periarteritis nodosa which was benefited and possibly cured by treatment with penicillin. Periarteritis nodosum has been considered a condition in which the mortality is very high. However, in most cases some of the lesions histologically show evidence of regeneration.

I like the change of the name from periarteritis nodosum to arteritis nodosum since it is more descriptive of the pathological findings.

What is arteritis nodosum? Is it a disease entity or is it a tissue reaction which may be due to different causative agents? This woman was benefited by penicillin. Penicillin is apparently of benefit in bacterial infections only. If this is true, we are perhaps justified in thinking that in this case the causative agent was bacterial infection. If we may add this case of possible bacterial infection to the growing list of etiological factors which have been reported as causing arteritis nodosum, we have added to our understanding of these pathological changes. Rich has reported finding arteritis nodosum in patients who had been treated by the sulfonamides, by iodine, etc., and has produced it experimentally by the injection of foreign proteids. Selye had produced arteritis nodosum in rats by the injection of adrenal cortex.

It seems that we should classify arteritis nodosum as a tissue change which may be produced by many quite different agents.

DR. J. A. LEPAK, Saint Paul: I should like to ask Dr. White whether any effort was made to isolate or culture an organism from the removel tissue?

DR. WHITE, closing: There was no effort made to isolate any organism. I have been impressed, in trying to get what information we have on this case, by the welter of evidence coming forth at this time that periarteritis, or better—arteritis nodosum, is a systemic reaction, allergic in character, and by its relationship to asthma; that the relationship that Alex Wilson showed to asthma is very suggestive. One interesting point is that in some of the cases of periarteritis associated with asthma a marked eosinophilia was found in the tissues. Some of the cases reported with asthma do not show these changes in the tissues. Eosinophilia is not shown in the tissues in the biopsy material in the present case.

THE TREATMENT OF HYSTERIA BY NARCO-HYPNOSIS

HEWITT B. HANNAH, M.D.
Minneapolis, Minnesota

There is no branch of medicine which is attracting the attention at the present time of both medical men and lay people more than the neuroses and so-called psychosomatic medicine. It is estimated that one-third of all patients who consult a physician do not have any definite bodily disease to account for their complaints. There is another one-third of the patients who have some bodily disease but their symptoms are not explained by the disease or they are out of proportion to any discoverable pathological disease. We can, therefore, readily see what an important role emotional factors must play in the practice of medicine.

It was about a century ago that Virchow introduced the structural conception of disease and this led to a consideration of disease as a disturbance or change in the structural cells and organs. This was the foundation of gross and histological pathology. Diseases were then divided into different components of ailments and this caused the development of the various specialties and specialists and the introduction of machines of precision for diagnosis. In other words, we had the machine age and the assembly line in medicine. Out of this grew the clinic idea of the practice of medicine.

During this period of mechanical and laboratory development, many essential discoveries were made which have permitted us to better understand, diagnose and treat the structural and biochemical disturbances of the body. During this age of mechanical development the emotional and psychological background of the patient was lost and even the phase of his illness was many times held in utter contempt by many doctors.

There has been a definite change in the attitude of physicians during the past ten years and the pendulum is swinging so that again there is marked interest being shown everywhere in the so-called functional disturbances. At this point, however, I want to emphasize the importance of thoroughly studying the patient from the organic standpoint to be sure he has no structural disease before he is branded as a neurasthenic, an anxiety state, or a case of hysteria.

The treatment of the psychoneurotic often leads to gratifying results but in such treatment the art of medicine comes to the fore and the personality of the doctor is still an important factor. There must be a never failing and kindly interest in the patient, and the doctor should not complain of becoming tired of his patient.

The physician must take a very careful and thorough history and develop all the conscious emotional complications that are present or have been present in the past. This usually takes more than one interview and the physician should see the patient many times, get to know him and gain his confidence.

Freud and his coworkers and followers have pointed out that there are many emotional traumas which have occurred in early life, as well as frustrations or repressions which have been buried in the unconscious mind and produce states of nervous tension and hysterical symptoms. It was out of Freud's concept that the system of psychoanalysis was developed so that these repressions, frustrations and emotional traumae could be released and brought out into the open conscious state. However, the psychoanalytic methods were long, tedious, and expensive, and very few men were trained or had experience to carry on the procedure.

It was during the present war that the procedure of producing a trance state or a state of hypnosis by drugs was used. This semi-sleep state has recently been referred to as narco-analysis. The drugs used have been sodium amytal, sodium pentobarbital, and sodium pentothal. The patient is not given enough of the drug to produce deep sleep but he is in a dream state or a semisleep state, or in a trance. The theory is that the drugs slow down respiration and there is reduced consumption of oxygen by the brain cells and a mild state of anoxemia results.

I am going to report a series of selected cases which have been treated by narco-analysis. The method used

Inaugural thesis.

is to dissolve 7.5 grains of one of the above-mentioned drugs in 20 c.c. of distilled sterile water. A platinum needle is used to prevent coagulation of blood aspirated from the vein when the injection is stopped without withdrawing the needle. The patient is placed in a semi-darkened room on a comfortable bed. No one else is present in the room except the patient and the physician. The injection is made very slowly and as soon as the patient complains of a numb feeling in the roof of his mouth, a slightly dizzy feeling, and a slightly drowsy feeling, the injection is stopped. The patient is able to hear what is said to him, is able to talk clearly and to answer questions distinctly.

While more barbiturate is being injected in order to keep him in this semi-sleep state, a closer hypnotic relationship is established between the patient and the physician. There is a free association of ideas. There is abnormal or extreme retentiveness of memory. Smallest details of information are related, which may seem trivial, and these become useful. Latent and repressed conflicts come to the surface. The history of mental suffering regains clarity and abnormal ideation becomes amplified. The physician obtains a quantity of information about the patient's mental state which could not be obtained during a much longer time with the usual methods. The length of time involved in a treatment may be as much as two or three hours. Every effort should be made to make the patient accept consciously the material which was obtained from his subconscious mind. This will render him more capable of viewing the past trauma in a sensible manner.

The following cases will explain more in detail the method involved.

Case 1.—A man twenty-two years of age, unmarried, was brought in six years ago by ambulance from another city. He would not talk, open his mouth, or move his arms or legs. He would only sit in a chair, with his eyes closed. He defecated and urinated in the chair or in bed. He had to be dressed, undressed, and carried into the bathtub. He would not open his mouth to eat and had to be tube fed. There was a history of acute onset about two weeks previously, and also a history of a somewhat bashful fellow who was a good student in school and conscientious in his work. He was a college graduate and his occupation was that of a pharmacist. He was observed for several weeks, and there was no improvement. He was tube fed during this time. Our impression was one of an acute attack of schizophrenia of the catatonic type.

Fifteen grains of sodium amytal were dissolved in 20 c.c. of sterile distilled water and injected slowly into his vein at the elbow. After a few c.c. were injected, the patient opened his eyes and looked around. He was asked questions, was encouraged to talk, and slowly unfolded the following story. About one year previously, he was taken, one evening, by a bunch of fellows by force as he was leaving the drug store to a house of prostitution. He was undressed, placed in a room with a group of nude girls, and the fellows were also present. The girls coaxed him to have relations with them but he refused, and then they attempted all sorts of perverted practices upon him. He said he was terribly frightened, his heart beat rapidly, he perspired and could not talk. They kept him there for several hours, then dressed him and pushed him out the front door. He found his way home, was in a very nervous state, and was afraid his parents would find out what had happened. The same fellows continued to come around the drug store, teasing him about the matter, and threatening to do it over again. He lived in constant anxiety and fear until he said one day it seemed as if he was unable to think, or to move or to talk. He related that he wanted to talk, to obey instructions, to go to the bathroom and to eat his meals, but he could not. In this dream state he was assured that he would be all right, and further sodium amytal was injected until he went to sleep.

Upon awakening, he got up out of bed, went to the bathroom, carried on a conversation with the nurses in a normal manner. He remained in the hospital for several weeks and I discussed the matter fully with him but never referred to what he related to me with anyone else. Six years have now elapsed. In the meantime he has married and I have seen him on numerous occasions. He has never had a recurrence.

Case 2.—This patient is a twenty-four-year-old married woman who has two children, six and four years of age. She had a high school education. Her general health had been good and she had had no operations.

Her present complaint was that of slapping her chest with the right hand, over a period of six years. This came on during the time she was pregnant with her first child. The previous diagnosis had been one of post-encephalitic syndrome. A neurological examination was negative except for this constant slapping of the right side of the chest with the right hand during her waking hours. The spinal fluid examination was negative. She had been treated with rabellon, stromonium, and sedatives.

I saw her on frequent occasions over a period of six months and could not elicit from her anything of an emotional character in her past history. It was my impression that the constant slapping of the right hand against the chest was not due to any organic disease of the central nervous system. She was finally hospitalized and given pentobarbital sodium intravenously. After a few c.c. were injected, the slapping ceased and she became very quiet. She complained of a numb feeling in the roof of her mouth and she said she had a feeling of well-being. She was then asked what had been bothering her or what had happened to upset her and make her nervous. She said that when she was a senior in high school she was going with two boys. She had had sexual relations with both of these boys. One month she did not menstruate and she knew she must be pregnant but she did not know which boy was the father. She was frightened about her condition and was afraid to tell her mother who was a strict disciplinarian and unduly religious. She did not know which boy she wanted to marry or which one she should blame for her pregnancy. Her nervousness increased and she finally decided to choose one of the boys and get married. She told the boy and they eloped and were married. Each boy did not know about the other boy having had relations with her. They came home after the marriage and announced their marriage to their respective families but did not tell of the pregnancy. About this time she noticed some shaking of her right hand and this continued to get worse during her pregnancy. Up to this time no one except her husband had ever been informed that pregnancy started before marriage. She had also never informed her husband of the other fellow and the possibility that the child did not belong to him. She stated that she lived in constant fear during these years that her husband might in some way find out about the whole matter and also that her mother might find out that she had been pregnant before her marriage. The twilight state was continued for about two hours in order to receive all of this history. She was told that the slapping of her right hand had come about because of all this emotional conflict and that when she awakened it would all be gone. Enough pentobarbital was given to her so that she went to sleep. Twelve hours later when she awakened, she was nauseated and vomited, but there

was no subsequent tremor or slapping of the right arm and hand. The whole matter has been discussed with her subsequently. She has gained weight and is getting along satisfactorily at home. Eighteen months have now elapsed without any return of symptoms.

Case 3.—A married man, aged fifty-two, government employe, lives in a small city. He was brought to my office in a wheel chair. He had not walked for five years. The history was that five years previously, on a cold winter morning, he was on his way to the office when he slipped and fell on the sidewalk. He had a pain in his back and in one hip, but after a short while he got up. He walked eight or ten blocks to his office, attended to some work, and then went to a luncheon meeting at a hotel. During the time he was at the luncheon meeting he had a weak feeling, and perspired. After lunch he walked into the lobby of the hotel and sat down because his legs were getting weak. He was taken home in a cab and by the time he reached home his legs had become very rigid. He was taken to a hospital where x-rays of his spine, pelvis, and hip joints showed no abnormalities. A spinal fluid was negative. He was told by one of the attending physicians that he had experienced damage to his spinal cord and that he would probably never be able to walk again.

At the time I first saw him, the neurological examination showed no sensory disturbance, no difficulty in bowel or bladder control, no great toe signs, no angle or patellar clonus, and the deep reflexes were within normal limits. The muscles of the legs were held flexed at the knees and in a state of spasm but the degree of spasm was not like an organic spasm but seemed to be to some degree intermittent. Another spinal fluid was negative.

He was put in the hospital, given a small amount of pentobarbital sodium and in a few moments his muscles were completely relaxed and he then told me how frightened he was when he fell down. He thought he could not get up, that he would freeze to death before any one would find him. On the way to the luncheon meeting his heart pounded in his chest, he perspired profusely, and a peculiar sensation came over him. In the trance state, he moved his legs freely in bed, we got him out of bed and he walked down the corridor of the hospital and back to bed. As he walked down the corridor, the syringe and needle were kept intact in his vein. He returned to bed, we gave him some further barbiturate and he went to sleep. Within two hours he wakened and his legs still had fairly normal tone and he moved them around in bed. However, within another couple of hours his legs gradually became spastic again. We repeated the treatment on at least a dozen occasions and several times were able to get him to walk up and down stairs and go onto another floor of the hospital. On at least one occasion the spasm did not return until about four hours after he wakened, and during this time he walked around in the hospital without any help. During his conscious state and before the spasm recurred, I discussed the whole matter with him but each time he would tell me that eventually his legs would become spastic again.

I consider this case a failure, but a most interesting experiment.

Case 4.—A married woman, fifty-five years of age, without any children, suddenly lost her voice about eighteen months before I saw her. Her husband accompanied her to the office and could give no explanation for her aphonia. The only way I could interview her was to write the questions, and she gave me the answers in writing. I could get no past history of instability from her husband. He stated he had come home from a business trip and found his wife speechless. They lived in another state, and she had been treated with vitamins, throat sprays, and by osteopaths and chiropractors.

The neurological examination was entirely negative. There was nothing in the physical examination of any consequence. I sent her to a very competent nose and throat man, and he reported to me that he could find no evidence of any disease of her larynx and that there was no paralysis of the vocal cords.

Under narco-hypnosis she gradually began to talk; at first she only whispered and then gradually the volume and quality improved. She stated that she lived alone and that her husband was gone on business for protracted periods of time. They never had any children and she was very much attached to her husband. Over a period of years on four or five occasions her husband had suffered attacks of hemorrhage from a duodenal ulcer. While out on the road he would have to be hospitalized and she would get a telephone call to go and see him in some distant town. She said she lived in constant fear that he would die in one of these attacks. About two months before her aphonia occurred, he had had another attack, was urged to have an operation, and had refused. She was terribly frightened over the prospective surgery and what might happen to him. She was also afraid he would die as a result of one of the hemorrhages. The day before he arrived home, the telephone rang and she could not talk when she picked up the receiver. She had not talked since. The whole situation was one of fear and anxiety, and her own worry her husband's possible death from either operation or recurring hemorrhage. Her loss of voice was a conversion type of hysteria which arose out of this conflict. Upon awakening she talked in a mild, low tone of voice, and during the next week her ordinary voice returned to its normal state. The whole matter was discussed frankly with her after the narco-hypnotic treatment was over.

Nine months have now gone by and she has had no more difficulty. Her husband has not had any surgery done and he has had no further hemorrhages.

Case 5.—A widow in her late fifties, who had been employed for many years as a clerk for the Soo Line, had not talked for about a year when I saw her two years ago. She had been treated for chronic laryngitis without any benefit. I had her examined by Dr. Larry Boies, and he found her vocal cords to be normal.

Her neurological and physical examinations were negative.

She was given pentothal sodium, and in the trance state she told me about the death of her husband some ten years ago. She was left with a daughter in her teens. After the death of her husband she had to go to work. She was very much attached to her daughter. The daughter had finished high school and was working and they were getting along very well. Two years before I saw her the daughter developed acute appendicitis and was operated upon. She got along very well in the hospital and was taken home on the eighth day. As she was taken from the automobile into the home, she slumped over and was dead when she was finally brought into the house. The mother was with her at the time. The mother told me that some time later during the day she had a queer feeling come over her and she could not make a sound.

After she awakened from the sleep, she talked normally and continued to talk in a normal manner. I heard from her frequently until April of 1946 when I received word that she had died suddenly and that an autopsy showed a coronary thrombosis.

Case 6.—This is the case of another middle-aged woman with an hysterical aphonia who was seen by Dr. George Tangen, who is associated with Dr. Boies. He was unable to find any disease of the larynx.

The physical and neurological examinations were negative, and the spinal fluid was negative. The underlying problem of an emotional character was the drinking and gambling of her husband and also her only child, a daughter, who was married to a man whom she did not like. She regained her voice and was all right for a

month and then lost her voice again. She returned for further therapy. She regained the use of her voice for another three months and now she cannot talk again. The underlying problem with her husband and her daughter still remains the same.

Case 7.—A married man, aged thirty-two was referred to me by an insurance company, because of intermittent jerkings of both arms and legs. These jerkings occur every afternoon and evening.

This man fell down a church steeple in Duluth, a distance of 80 feet, in 1940. He landed on a salamander. He fractured his pelvis and one hip, and received some third degree burns on his back. He was hospitalized a long time and finally left the hospital after almost a year's stay. Sometime later in 1942, he had an occasional muscle twitching in his body which occurred toward the end of the day. He was married in 1942 and he has one child. He has been able to work but toward the end of each day, this intermittent jerking occurs. He stated that doctors had told him it was the nervous shock from the fall.

The neurological examination was again negative except for the body jerking.

Under narco-hypnosis he told me the following story. While in the hospital following the accident, he fell in love with his special nurse and after he left the hospital he saw her frequently and wanted to marry her. He had sex relations with her quite frequently. However, she did not want to marry him, and she went east to get another position. While the nurse was gone he met his wife and married her, although he was not in love with her. His wife is frigid and rather quiet. Her family visits them a great deal and he dislikes it. All in all, he is unhappily married. His wife does not know about the other girl. He stated that while at work he does not have to think of the other girl but when he comes home at night he sits down and dreams about her. He also stated that when he thinks of the nurse he almost always has the picture of himself falling down the steeple. Then he seems to jerk his body.

While under narco-analysis, the whole thing was discussed with him from an emotional and intellectual standpoint. He has had three treatments and was seen several times between treatments. The whole matter was discussed with him, and he now seldom has any jerking.

Case 8.—This was an unmarried woman, forty-two years of age, who was referred to me by an orthopedist. She had an excellent position with one of the advertising agencies in the Twin Cities. Her immediate complaint was that when she walked, she turned her head toward the left. This never occurred when she was sitting or standing, but as soon as she started to walk her head would turn to the left. If she put the tip of a finger against her chin, then her head would not turn. If she walked with a pencil or a cigarette in her mouth, then her head did not turn to the left. Even if she had a thread between her lips when she walked, her head did not turn.

This woman had been examined and re-examined by various competent people and no explanation had been given her for this turning of the head except she was told it was a habit.

Under pentothal sodium she related a long series of emotional difficulties in her past life. When she was fifteen years old her local neighborhood butcher attempted to have sexual relations with her in the back part of the butcher shop. She says she was terribly frightened and never told anyone.

Later, she met a man in Iowa, was engaged to him, had relations with him, but the engagement was broken off. Subsequently this man went to Chicago and was married. Some years later, our patient met him again in Chicago and over a period of time they carried on illicit relations. She told me that she had to be transferred to another city in order to get away from him. When she reached another city, she got along in a satisfactory manner for a while until she met a group of men and women. At a party one night, the lights in the house all went out and she realized that everyone there was having sexual relations. The fellow she was with attempted to have relations with her but she would not have anything to do with him. When the lights finally came on the rest of the members of the party made fun of her and she was in a very embarrassing position. A few days after this experience, she noted the phenomena of her head turning to the left. It took some two to three hours for her to relate all of her experiences in the past.

A week later she returned to the hospital and remained another twenty-four hours and was given another injection of pentothal sodium. She related many of the details of her past experiences again and added others to them. Subsequently I saw her several times in my office and we went over all the experiences which she had related to me under narco-hypnosis. Three months have now elapsed and the last time I saw her she told me there was no more turning of her head to the left. She does not have to put a pencil in her mouth or smoke a cigarette or put the tip of a finger to her chin in order to keep her head from turning.

Case 9.—This is the case of a twenty-five-year-old ex-service man who awakened every night between 1:00 and 5:00 A.M. with pain in his left lower abdomen. He would get up and walk the floor or take a hot bath or smoke cigarettes for a couple of hours. The pain was intermittent in character. He had been examined by the army and by several clinics, and a diagnosis of a functional neurosis had been made. He was the son-in-law of a physician, and the physician had gone to no end of trouble in trying to find some organic basis for this pain.

Under narco-hypnosis the patient told of a very exciting experience, when he was about twelve years old, which occurred on the north shore of Lake Superior. He was in a cabin with his parents when lightning struck the cabin and it partially burned during a heavy rain storm. He became very tense and nervous, could not talk, and had to be carried into another bed. Following this experience, he stated that he had always been very tense and unable to relax. When he was attending the university, he would be very much upset at the time of examinations. He finally went into the army and was in the air corps. Every time he had to make a flight, and especially if the flight was at night, he was very distressed and when the plane landed he would frequently be unable to get out of the plane for a matter of five to ten minutes. It was while he was in the Pacific that he began to have the attacks of pain in his abdomen at night.

This fellow has had three treatments, and the pain has disappeared at night. He is still having attacks of pain to a lesser degree in the daytime and still has a feeling of nervousness and tenseness.

Case 10.—This woman, whom I have seen recently, is about fifty years of age. She shrugs her shoulders. This shrugging of her shoulders occurs during the daytime but is gone during sleep.

Under drug hypnosis, she told about her husband's drinking, gambling, going out with other women, and how her only daughter had become pregnant and had a baby out of wedlock. She is still in the hospital and the shrugging of her shoulders has not entirely disappeared, but she is much better.

Conclusions

1. Drug hypnosis is very valuable in obtaining history which otherwise could not be obtained.

2. It brings out of the unconscious many emotional conflicts, repressions and frustrations. It gives one an

opportunity to discuss these matters with the patient and synthesize them in the conscious state.

3. It is not a cure-all for functional nervous cases but it is certainly of great value in selected cases of conversion hysteria where other methods have failed.

4. All cases of conversion hysteria do not respond to this type of treatment but there is a sufficient number of cases which do respond to make it a very valuable therapeutic measure.

Discussion

DR. HANNAH: There is another feature in narco-hypnosis that offers a very interesting future. A man, recently referred to me by the United States Shipping Corporation, complained of inability to hear when he was tested on the audiogram. The audiogram showed an 80 per cent loss of hearing in each ear. However, this man could hear ordinary conversation without much difficulty. In conjunction with one of the otologists, we put this man through the tests when he was in a state of narco-hypnosis. In this state, he could hear very much better, and the loss of hearing was only about 20 per cent. This test was repeated under narco-hypnosis four times with practically the same results. When the man awakened four hours later, he had no memory of the tests.

This offers a very fruitful field for determining alleged loss of hearing or loss of sight in medicolegal matters.

The meeting was adjourned.

A. E. CARDLE, *Secretary*

POLIO COSTS IN MINNESOTA

Approximately $2,000,000 will have been expended in Minnesota by the National Foundation for Infantile Paralysis to combat the 1946 polio epidemic before the last case can be considered closed, according to Charles B. Rogers, state campaign chairman for the annual "March of Dimes." This total represents half of the epidemic emergency fund for the National Foundation and more than two times the contributions of Minnesota residents to the "March of Dimes" since it was launched in 1938.

This sum represents costs of medical, nursing and physical therapy care, hospital bills, salaries and maintenance of nurses, and equipment. More than 900 nurses, 40 physical therapists, two epidemiologists, 43 respirators, 60 hot pack machines, 18 suction machines, and some 2,400 pounds of wool for hot packs were sent into Minnesota during the epidemic. Personnel and equipment were rushed in by planes, trucks and trains.

"Next to the Minneapolis General Hospital," Mr. Rogers reports, "the Kenny Institute received the largest contributions of any of the six Minneapolis hospitals used for the care of polio patients—more than $46,000. In addition, more than $24,000 of doctor and hospital bills were paid for patients who received the Kenny treatment in the Kenny Institute."

The University of Minnesota, since 1938, has been granted $699,243 by the National Foundation for investigation, research, and short courses for physicians, nurses and physical therapists.—*Bulletin*, Hennepin County Medical Society, January, 1947.

GETTING THE MOST FROM A PATHOLOGIST

(Continued from Page 279)

Most of the autopsies in the country today are being done by relatively untrained and inexperienced men. Attention to detail is of first importance. The cause of death will be found in the great majority of cases without microscopic study, but sections will add greatly to confidence in gross conclusions. A few blocks of tissue in 10 per cent formalin can be submitted to the pathologist, along with a copy of the clinical history and gross findings. With knowledge of the diagnostic problem at hand, he will prepare a tissue report with relevant information. The doctor should always request these slides and study them.

If the autopsy problem is one of possible poisoning, the tissue must not be formalized. Generous specimens of blood, urine, heart, liver, spleen, brain, stomach, and gastric contents, are packed in ice and sent either to the coroner of Hennepin or Ramsey county or to a toxicologic laboratory recommended by him. There are very few good laboratories of this type in the state. The University of Minnesota has no facilities for toxicologic diagnosis.

It has been the intention of this paper to present some of the advantages and shortcomings of pathologic examination and to suggest that too little information is forwarded with specimens. The pathologist can profitably use clinical findings when studying tissue but usually is forced to do without them. The clinician who wants the ultimate in diagnostic accuracy will properly prepare his tissues for examination and will write a history. The preparation of such a report to accompany each specimen consolidates the ideas of the doctor and stimulates the interest of the pathologist.

The single flaw in the remarkable progress in the control of tuberculosis in the United States is the fact that the disease is still a major cause of death, killing more Americans than all other infectious and parasitic diseases combined. In spite of a constant search for drugs to effect a lasting cure, no substance has been found that is completely satisfactory. Various sulfonamides, although capable of modifying the disease in experimental animals, have proved too toxic for continuous use in human patients, and streptomycin, which provides considerable protection, has not effected permanent cure. Since no specific remedy has been discovered, the accepted methods of treatment which have obtained excellent results in a great many cases, must be relied on. Editorial, New England J. Med., (Dec. 5) 1946.

Minneapolis Surgical Society

Stated Meeting Held December 5, 1946

The President, Thomas J. Kinsella, M.D., in the chair

SURGICAL MANAGEMENT OF CHRONIC FISTULAS OF THE RECTUM FOLLOWING PENETRATING WOUNDS

ROBERT J. TENNER, M.D., F.A.C.S.
Minneapolis, Minnesota

This paper presents a discussion of sequelae of a type of injury which fortunately is rare in civilian practice, but which was a not infrequent occurrence during this past war. It deals with injuries to the infraperitoneal portion of the colon which were caused by missiles entering the dorsum of the body, penetrating the rectum, and resulting in persistent chronic fistulas in this region.

Much has been written recently regarding wounds of the rectum and infraperitoneal portion of the large bowel. The initial surgical treatment and the definitive treatment have been discussed in detail. Nevertheless, I wish to describe my experienc in the surgical management of seven cases of this type of fistula. By chronic fistulas is meant such as have persisted for three to five months since injury despite diversion of the fecal stream by colostomy. Such fistulas communicated in all instances with the posterior or posterolateral portion of the extraperitoneal rectum, and the external openings were found in the sacrococcygeal and right and left buttocks regions at the location of wounds of entry of the missiles.

When first seen, such patients all had good functioning colostomies and their chronic fistulas were apparent on the dorsum of the body. In some cases there was a healed, depressed, firm, fixed scar on the right or left buttocks, in the center of which the external orfice of the fistulous tract could be seen; in others there was a clean granulating wound, in which the fistulous tract opening could be identified. On evaluating the direction, depth and extensiveness of the fistulous tract, several diagnostic measures were used including barium enema (to check patency of the distal loop also), lipiodol injection, methylene blue injection, digital examination of the rectum, proctoscopic examination and probing of the wound. In all cases the extent of the fistula was ascertained readily and in most of the cases a probe could be inserted through the external opening and could be felt in the lumen of the bowel by the examining finger. Barium enema alone was not very helpful as it was difficult to introduce barium into the small sinus tract in some instances. However, in the lateral view, the barium enema usually showed a posterior tenting of the rectum, and this deformity caused by adherent scar would demonstrate the location of the internal opening. There were three defects which were quite large and would admit the tip of the examining finger in the internal opening.

History

A typical history given by the seven patients up to the time they entered our hospital was that of a young soldier from twenty to thirty years old who was wounded in the buttocks or sacrococcygeal area by gun shot or shrapnel. He was admitted to an aid station, then a surgical evacuation hospital, where treatment was instituted.

Three patients received minimal debridement and abdominal exploration at the surgical or evacuation hospitals. Retroperitoneal hemorrhage was found, injury to the rectum suspected and colostomy performed. All three patients later displayed fecal fistulas through the entrance wounds. Two of the seven patients were treated ideally. The wound of entrance was debrided, and it was apparent that the recum had been perforated. In such cases the rectal wound was closed, the wound packed open loosely and sigmoid colostomy performed. In one soldier the wound was debrided and packed loosely, and in this instance abdominal pain resulted together with signs of abdominal injury. A celiotomy was performed but nothing except retroperitoneal or infraperitoneal hemorrhage was apparent, and the abdomen was closed. A fecal fistula developed within two days in this soldier and it was necessary to make a loop colostomy. Immediate treatment of one soldier who had a large posterior bowel perforation consisted of debridement only and, due to other wounds, shock was present and was treated. On the fourth day after injury he improved and it became evident then that a fecal fistula was present. Colostomy was performed. All seven soldiers were given careful and adequate supportive treatment and were evacuated to the zone of the interior.

On arrival at our hospital all seven patients presented the chronic fistulas described above. Their general condition was good. The abdominal wounds were healed and all colostomies were functiong adequately.

All seven soldiers had had early surgery following the injury and one important principle was carried out in all, i.e., the perirectal space was drained by incision and debridement. In two patients the ideal treatment was instituted initially; that of incising and draining the perirectal space by debridement, then locating the perforation, and closing this opening into the rectum, followed by colostomy. Unfortunately, in both soldiers

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Inaugural thesis as a member of the Minneapolis Surgical Society.

From the Surgical Service, Billings General Hospital, Fort Benjamin Harrison, Indiana.

chronic fistulas resulted, but I am certain that a great many similar wounds to the rectum were healed in this manner. Croce[1] cited two instances of spontaneous closure of rectal fistula following colostomy alone. There were many other similar instances, no doubt.

It is difficult to determine why such fistulas persist. In all of the soldiers I operated on, the mucosa was everted and markedly adherent to the dense scar tissue which resulted from the healing by secondary intention. In three patients the coccyx had been removed in the original debridement. In two, the badly comminuted coccyx was still present and fixed in the surrounding area by scar tissue, and in the remaining instances the coccyx was undisturbed.

Surgery

Operation was performed in all seven soldiers. The fistulous tracts were excised, the perforations closed and the wounds packed open to permit healing by secondary intention.

Preoperative preparation consisted of irrigating the distal loop, following which all fluid was aspirated. Usual preoperative medications were given, and low spinal anesthesia was used in all instances. A suspension of sulfasuccidine was instilled into the distal loop daily for three or four days preoperatively to decrease the bacterial flora.

At operation almost all of the scar was excised by elliptical excision. The incision was carried toward the midline when the external opening was in the lateral buttocks and the coccyx or fragments of coccyx were removed if present. Very good exposure resulted. The fascia propria was incised transversely in the midline for additional exposure, and by means of blunt dissection through the areolar tissue the proximal rectum was identified as described by Murray.[2] In two patients the perforation was identified at the tip of the fifth sacral vertebra, and in both the everted mucosa was attached firmly to the anterior aspect of the sacrum by osteoperiosteal scar tissue. Removal of the fifth sacral segment by rongeur and stripping of the bowel from the periosteum were necessary in order to mobilize the rectum. In all instances the perforation was identified and the scarified margins excised. The rectal segment was mobilized sufficiently in large perforations to make transverse closure possible, thus preventing undue narrowing of the lumen. With an opening less than one centimeter in diameter, the scarred margin was cleaned and closure made in the direction of least tension, sometimes by purse-string suture. Two rows of inverting interrupted chromic catgut 000 were used in all seven cases. The finger was inserted in the rectum to ascertain a complete closure. Sulfathiazole powder was dusted into the wound and a boric ointment-laden gauze was packed lightly into the defect. A few deep interrupted silk sutures were placed in the lateral extremes of the incision in order to close some of the dead space, but such merely diminished the size and extent of the wound which was to heal by secondary intention.

Postoperative Care

The packs were removed within twenty-four hours and a light cradle was applied to keep the wound dry. Sulfathiazole again was dusted into the depth of the wound and the cavity packed lightly with dry gauze. The wound was dressed daily until healed in three to five weeks. Two or three days after operation all patients were permitted to be up and about the ward. All wounds healed solidly except one which broke down on the seventh day. In this patient the spur of the colostomy was below the skin surface and feces entered the distal loop. I believe this was the main factor in the recurrence, because, after reconstruction of the colostomy and adequately diverting the fecal stream, the fecal fistula was again operated on in the above described manner and healed completely.

In all these soldiers the colostomies were closed while I was still in the army, and there were no recurrences. The most recent colostomy closure was followed for only three weeks. At that time the patient was having normal bowel movements, and the posterior wound was well healed.

Discussion

Perforation of the rectum must be suspected in instances of penetrating injury to the perineal, sacrococcygeal region, or buttocks. Usually a perforation can be seen by proctoscopy or identified on digital examination. If much blood is seen in the rectum, bowel damage usually is present. With bleeding from the rectum and lower abdominal pain present, exploratory operation is indicated if condition of the patient permits. Any injury to the colon above the peritoneal reflection can be repaired and, if retroperitoneal injury is suspected by evidence of hemorrhage in the retroperitoneal space, exclusion colostomy may be performed. Following this procedure, it is important to debride the wound of entrance and adequately drain the perirectal space. If a perforation is seen it should be sutured. If no perforation is seen, the space should be drained, nevertheless, to guard against possible later perforation which may occur because of infarction or contusion of the bowel wall. The colostomy will control the sepsis by eliminating gross contamination and reducing the intraluminal pressure. In addition the incidence of secondary hemorrhage and even perforation of the bowel may be reduced by colostomy. A few cases reported in the literature with perforation of the rectum have had the above ideal treatment, yet fecal fistula has resulted. This may be accounted for by (1) inadequate closure of the perforation, (2) not inverting the mucous membrane and approximating the serosal surfaces of the bowel, (3) the presence of too much infection, (4) a colostomy which does not completely divert the fecal stream or (5) inadequate blood supply as a result of the injury. When the bowel wall is everted and adherent to surrounding structures by scar, there is little chance of the fistulas closing. Many fistulas will heal by conservative means, and some will heal intermittently, only to break down later.

In patients who develop chronic fistulas in spite of the above program, another operation should be performed.

After exposing the area adequately the bowel segment is mobilized sufficiently to close the perforation without tension and the wound allowed to heal by secondary intention.

It is fairly well established that the majority of fecal fistulas of the abdominal colon will close and heal spontaneously, providing the lumen of the bowel is adequate to permit the passage of feces in this area. Further, fistulas from the infraperitoneal colon secondary to operation for low-lying carcinoma with low resection of the rectum usually will heal spontaneously. But with chronic fistulas herein discussed there is little or no chance of spontaneous healing because of trauma, scar tissue, poor blood supply and absence of peritoneum, and surgical repair is certainly indicated.

Summary

Seven soldiers were operated upon for chronic posterior fecal fistula which communicated with the infraperitoneal portion of the rectum following injury by shrapnel and gun shot.

All patients had been operated upon in overseas installations. The wounds of entrance had been debrided and colostomies performed.

There was no evidence of osteomyelitis of the coccyx or sacrum present in any of these cases, in spite of the persistence of mucopurulent and fecal drainage from the fistulas.

The seven patients were treated in a standard manner. The fistulous tract including the surrounding scar tissue down to the bowel wall was excised. The rectum was mobilized adequately, margins of the perforations freshened, and the perforation closed by two rows of fine chromic catgut suture inverting the bowel wall. The wounds were packed lightly with gauze and allowed to granulate in.

Wounds healed readily without complications in six instances and the colostomy was closed later without recurrence of the fistulas.

One patient failed to heal. An inadequate colostomy was reconstructed so that the fecal stream was diverted completely. A further operation was successful and the colostomy was closed later.

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Discussion

DR. WALLACE I. NELSON: Allow me to insert a few words about prophylaxis. Now that the war is over it is a little late to prevent these complications in battle casualties, but the principles hold for injuries in civilian life. In studying a large number of these patients with colostomies returning from overseas, I found that a number were not properly defunctioning the distal loop. There were also a large number of patients with wounds of the rectum who merely had a colostomy established but did not have the pararectal space drained until an abscess had formed. As a matter of prophylaxis, I think that the establishment of a truly defunctioning colostomy and the early drainage of the pararectal space would prevent some of the chronic fistulas.

DR. JOHN R. PAINE: I would like to point out one other thing. Doctor Tenner's selection of these cases represents a group of patients which presented as many difficulties as any type of wound which medical officers saw. I think that type of wound, if one excludes the thoraco-abdominal wounds, had about as high a mortality as any in the major categories of wounds. In such cases it was found best by experience to operate on the pelvis first and the abdomen last. This was largely due to the matter of shock occurring with shifting the position of the patient. Frequently, he had to be turned over on the abdomen in the Kraske position to have pelvic surgery done and withstood the shock much more poorly than if the pelvic surgery had been done first.

PULMONARY DECORTICATION FOR INFECTED ORGANIZED HEMOTHORAX

Report of a Case

By H. P. HARPER, M.D.† (By Invitation)
Minneapolis, Minnesota

Pulmonary decortication was described originally in 1893 by Fowler,[4] who advocated the procedure in the treatment of chronic empyema. For various reasons the operation was not widely accepted until World War II. Decortication carried out early in the course of an empyema usually resulted in recurrent or spreading infection. Postponement of the procedure until the empyema cavity became relatively sterile resulted in overmaturity of the fibrin wall which made stripping impractical or impossible. In the treatment of organized hemothoraces in the war wounded, the advent of effective chemotherapeutic agents and antibiotics was very timely. By their use, septic complications were reduced to a minimum and the time of surgical intervention became elective. In these cases, pulmonary decortication attained such notable success that the procedure possibly should be re-evaluated as to its place in the treatment of empyema.

It appears that even in experienced hands at least 5 per cent of all significant acute hemothoraces result in either empyema or a chronic organizing phase in spite of various methods of therapeutic management.[2,6] The chronic phase is characterized by the development of an intrapleural, space-occupying, fibrous envelope usually filled with a viscous, plasma-like liquid, containing fibrin shreds and the debris of degenerated red blood cells. The exact pathogenesis and mechanism of this change are not entirely clear but, at least under certain circumstances, whole blood in the pleural cavity apparently lays down its fibrin content on all pleural surfaces bounding it. The constant thrashing movements of the diaphragm, mediastinal wall, and thoracic wall possibly stimulate this fibrin deposit on the moving parts in much the same manner as occurs when whole blood is stirred with a spatula.[3] Simultaneously, red cell degeneration begins at the center of the hematoma in the defibrinated blood, which is much diluted by effusion from the easily irritated pleura. Early in the course of events, while fibrin is still being laid down about the periphery of the hematoma, active fibroplasia and angioplasia begin in the fixed fibrin nearest the pleura.[1] This proliferative process proceeds from the pleura towards the center of the hematoma and, in about three weeks,

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†Surgical resident, Minneapolis Veterans Hospital.

results in the formation of adult fibrous tissue in those portions nearest the pleura. This organizing fibrous wall has been given the name of "peel." If undisturbed surgically or otherwise, the peel and the underlying pleura are said to attain cellular intimacy in about eight weeks.[1,3]

A markedly decreased vital capacity produced by the persistent space-occupying lesion is the most pronounced physiological disturbance of an uncomplicated organizing hemothorax. The immobilization of the diphragm and mediastinum further disturb normal physiology and may give rise to symptoms. The collapsed and partially atelectatic lung is very prone to abscess formation, bronchiectasis, or pneumonitis. The nutrient-rich fluid contained within the peel is also particularly subject to infection and to the development of complicating empyema.

Organized hemothorax does not produce any particularly diagnostic symptom complex. Its development in carefully followed chest injuries is usually obvious, but many cases are asymptomatic until supervening infection precipitates signs. As has been pointed out frequently, the history of significant chest trauma may be misleading or difficult to elicit. Nonspecific symptoms such as chest pain, dry cough, dyspnea, malaise, anemia or weight loss may direct attention to the chest. Hemoptysis, foul sputum, chills, and fever usually are the results of complications, but often provide a lead. The history of even insignificant chest trauma; the clinical and roentgenological demonstration of an immobile, persistent, space-occupying, intrapleural mass; and the aspiration of blood or degenerated products of blood from the mass usually suggest the diagnosis.

Since atelectatic lung and the degenerated center of an organizing hemothorax are both very prone to develop infection, the primary aim of surgery must be the complete re-expansion of the lung with obliteration of all dead space. In cases where more than 50 per cent of a pleural cavity is involved, this can be accomplished best by evacuation of the liquid contents of the mass and removal of that portion of the peel actually constricting the lung. Normal respiratory physiology may be re-established further by removing the constricting peel from the diaphragm. Since the peel develops adult fibrous tissue in its deep layers after three weeks and does not attain cellular intimacy with the underlying pleura until eight weeks, this is the ideal period for decortication. If decortication is attempted too early, the peel will not have attained sufficient intrinsic strength to allow easy surgical manipulation. If allowed to mature too long, the peel can be separated from the underlying pleura only with difficulty, and much capillary bleeding results. In this over-mature stage decortication may result in such extensive tearing of pleura and lung tissue that Ransohoff's discission operation[5] may be the procedure of choice.

By proper use of effective chemotherapeutic agents and antibiotics, pulmonary decortication may be carried out successfully even in the presence of infection within the hematoma. Burford, et al.[1] report nineteen cures out of twenty-five cases of infected organized hemothorax treated by decortication. The remaining six developed small basal empyemas requiring further minor surgery. From this and other reports of comparable success in the treatment of this special type of empyema, it is interesting to speculate that, with the development of further improved bacteriostatic and bacteriocidal agents, pulmonary decortication may become the treatment of choice in the management of most empyemas.

Recently at the Minneapolis Veterans Hospital a pulmonary decortication was performed successfully for massive infected organized hemothorax. As a reminder that this condition occurs in civilan life and as evidence of the effectiveness of the procedure in spite of existing infection, the case is reported in some detail.

Case Report

A railroad lunch concession clerk, aged fifty-five, was admitted to the Minneapolis Veterans hospital, August 6, 1946, with a history of having sustained minor lacerations of the right elbow, the right knee, the frontal scalp and the right anterior chest the night of June 24, 1946, when he tripped over a railroad tie while returning home from work. The lacerations were sutured and dressed by his family physician who was consulted the same night. There were no significant symptoms, and the patient continued his usual work for about two weeks thereafter.

On the night of July 8, 1946, the patient experienced a sudden, rather oppressive dyspnea when he arose from bed to urinate. Severe sharp pains in the right lower chest began at the same time. The pain was most marked posteriorly and was made worse by deep respirations. There was no cough, sputum, or hemoptysis. Weakness, malaise and anorexia were progressive, and the patient was unable to work. The dyspnea persisted and was aggravated by any type of exertion. The right chest pain gradually decreased in severity and disappeared completely by the end of the month.

A dull aching pain and sensation of numbness in the right shoulder appeared, August 3, 1946. This pain seemed to radiate down the right arm to the ulnar side of the hand. The patient finally decided to seek further medical advice because of this new symptom and because of his poor general health, including a weight loss of 20 to 25 pounds.

The past history, family history, and history by systems were noncontributory.

The physical examination on admission revealed a fairly well developed but rather emaciated white man displaying moderate but obvious dyspnea. His temperature was 101 degree Fahrenheit. The pulse was 120 per minute. Respirations were counted at 24 per minute. The blood pressure, 110 systolic and 70 diastolic in millimeters of mercury. The general physical examination was essentially negative except for the chest which showed almost complete lack of respiratory excursion on the right. There was percussion dullness with total absence of fremitus and breath sounds on the right side below the level of the third rib anteriorly. The heart was normal in size to percussion, and no murmurs or irregularities of rhythm were detected.

Admission laboratory tests showed a hemoglobin of 8.6 Gm. and erythrocyte count of 3,260,000 for each cubic millimeter of blood with hyperchromasia, anisocytosis, and poikilocytosis on smear. The leukocyte count was 8,400 with 76 per cent polymorphonuclears, 23 per cent lymphocytes, and 1 per cent monocytes. The sedimentation rate was 115 millimeters in one hour. Urinalysis, blood serology, and sputum studies for acid-fast

Fig. 1. Chest x-ray examination on admission shows massive right hemothorax.

Fig. 2. Chest x-ray examination immediately postoperative shows 75 per cent re-expansion of the right lung.

Fig. 3. Chest x-ray examination at the time of postoperative follow-up shows some residual thickened pleura in the right lower thoracic cavity.

bacilli were negative. Blood chemistry studies were all normal.

X-ray examination on admission (Fig. 1) demonstrated fluid obscuring the entire right half of the thorax except for a narrow triangular strip of air-containing lung ascending from the right hilum to the apex.

The diagnosis on admission was "pleural effusion, right thorax, etiology undetermined," and the patient was accepted on the medical service for detailed study and treatment.

A thoracentesis of the right chest was performed August 8, 1946, and 500 cubic centimeters of syrupy dark red fluid were aspirated. X-ray examination immediately thereafter showed no significant change other than the appearance of bubbles of air overlying multiple fluid levels. The roentgenologist's diagnosis was multilocular, encapsulated empyema. Laboratory examination of the aspirated fluid showed a protein of 3.7 grams for each 100 cubic centimeters, a leukocyte count of 18,000 for each cubic millimeter of fluid, and an erythrocyte count of 500,000 for each cubic millimeter. No tumor cells or acid-fast bacilli were found. Culture of the fluid was positive for hemolytic staphylococcus aureus.

General supportive medical management was carried out, and the patient was given two blood transfusions of 500 cubic centimeters each. He improved somewhat clinically but continued to follow a febrile course with a daily fever of 100° to 101° F. in spite of the administration of 40,000 units of penicillin parenterally every four hours. On August 13, 1946, a second thoracentesis was performed and 350 cubic centimeters of fluid identical with that of the first aspiration were removed. Re-examination of the blood on August 14 showed that the hemoglobin had risen to 14.6 Gm. and the erythrocyte count to 4,250,000.

August 15, 1946, the patient was seen by the surgical service in consultation. The diagnosis of an infected organized hemothorax seemed likely but a primary malignancy of the pleura could not be excluded because of the patient's age, the insignificant history of trauma, and the lag between apparent trauma and the onset of symptoms. It was felt that in either case an exploration of the right chest was indicated.

Operative Procedure.—On August 16, 1946, the right thorax was opened after wide subperiosteal costectomy of the seventh rib under intratracheal cyclopropane anesthesia. About 2,000 cubic centimeters of syrupy brown fluid containing many large soft fragments of fibrin were removed and the typical firm, smooth peel of an organized hemothorax was revealed. Superiorly slight transmission of the respiratory movements from the constricted atelectatic lung could be felt. Palpation inferiorly showed a diaphragm completely immobilized by the fibrous peel. No evidence of neoplasm was detected.

That portion of the peel in contact with the lung superiorly was then removed by careful blunt dissection. A similar removal of the peel from the diaphragm resulted in immediate resumption of normal respiratory excursions. The lung was freed from minor adhesions of the upper mediastinum and then was expanded to normal size by positive pressure applied through the intratracheal tube. Fenestrated catheters were placed in the lower portions of the thoracic cavity anteriorly and posteriorly through trocar punctures and the operative incision was closed tightly in layers without drainage using fine interrupted silk sutures. 100,000 units of penicillin in 400 cubic centimeters of saline were instilled through the posterior catheter and, after maximum expansion of the lung had been assured, both catheters were clamped. The tracheo-bronchial tree was aspirated per bronchoscope and the patient was returned to his room where a constant negative pressure of 12 to 14 centimeters of water was applied immediately to the anterior catheter by means of a Stedman pump setup. The patient remained in the Trendelenburg position until his blood pressure was stable and he had fully recovered from anesthesia. He was then placed in semi-Fowler's position. After a period of six hours, in which to allow residual penicillin to be effective, the posterior catheter was unclamped and likewise attached to the suction apparatus. Chest radiograph taken directly after surgery showed that the right lung had been re-expanded to about 75 per cent of normal (Fig. 2).

Postoperatively, particular attention was directed toward the maintenance of uninterrupted negative pressure within the affected side of the thorax. Twenty cubic centimeters of 250 units for each cubic centimeter of penicillin were injected by needle through the wall of each catheter every four hours to keep them clear. Fluid balance was maintained carefully and protein intake augmented by 45 grams of amino acids intravenously for each day. Forty thousand units of penicillin were administered parenterally every three hours, and pain was controlled by the administration of 50 to 75 milligram doses of demerol.

Examination of the fragments of peel removed at operation showed them to be firm and fibrous with an average thickness of 5 mm. Microscopically (Fig. 4), the surface toward the center of the hematoma was made up of many young fibroblasts and newly developing capillaries. The surface toward the pleura was densely fibrous and resembled scar tissue. The intermediate area showed gradual transition between these extremes.

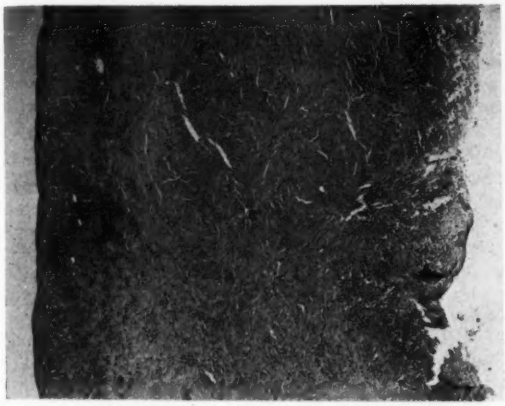

Fig. 4. Microphotograph of the peel removed at operation. On the right is the mature fibrotic peripheral portion. On the left is the immature organizing central portion showing active fibroplasia and abundant newly developing capillaries.

On the third postoperative day the anterior catheter was removed, and the patient was allowed to sit on the side of his bed the following morning. On the fifth day the posterior catheter was removed, and the patient was allowed up in a wheel chair. Convalescence was steady, and by the ninth postoperative day he was fully ambulatory and afebrile.

On August 27, 1946, the eleventh postoperative day, a fever of 100.6° developed, and examination revealed a phlebothrombosis of the lower extremities extending up to the popliteal spaces bilaterally. Anticoagulant therapy consisting of oral dicumerol and continuous intravenous heparin was started at once. The blood prothrombin concentration decreased enough in forty-eight hours to permit discontinuance of heparin. Administration of oral dicumerol was continued for a total of 10 days. The remaining convalescence was uneventful and the patient was discharged from the hospital, September 10, 1946.

On November 1, 1946, the patient returned to the surgical outpatient section for postoperative checkup. Physical examination at that time revealed nothing abnormal except minimal tenderness in the operative scar. The patient had gained about 14 pounds in weight and felt very well. X-ray examination of the chest revealed some residual thickened pleura at the right base but was otherwise normal (Fig. 3).

Summary

The pathogenesis of organized hemothorax is discussed briefly. The case of a patient with an infected organized hemothorax who became symptomatic two weeks after apparent insignificant chest trauma is reported. The technique of the decortication operation and the postoperative management of the reported case are presented in some detail.

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Discussion

DR. JOHN R. PAINE: Doctor Harper's case is the first one of the kind which has come to my attention in civil practice. It is still difficult for me to believe that the trauma this man says he suffered caused the hemorrhage in his chest, but we have been able to find no other cause. Those who have had no experience in decortication of the lung have missed some of the pleasures of surgery. There are certain things that give us pleasure. A surgeon derives real satisfaction, after going into the chest, scooping out cups of blood and not being able to find the lung, in taking the peel off and seeing the lung expand under his hand so that when he has finished the lung fills the chest cavity completely.

We had a striking experience during the war treating organized hemothorax. The American way of treatment in most of these cases was as Doctor Harper has indicated. The British never did become convinced of the merits of this operation. They stuck. to the conservative idea of repeated aspirations. That isn't entirely true but the general British plan was not to do so radical an operation. They preferred to aspirate a few ounces of fluid this week and then next week take a few more ounces. In the majority of cases treated this way, the patient regained a large percentage of his vital capacity, but I do not believe the recovery was as complete as when the patient is operated on and the peel removed. I am sure the time of recovery is much shorter when the patient is treated by the method described by Doctor Harper.

CRITERIA FOR CHOLEDOCHOSTOMY TUBE REMOVAL

R. W. UTENDORFER, M.D.†

Minneapolis, Minnesota

The general policy of surgeons in this area has been to insert some type of choledochostomy tube whenever the common bile duct has been opened during a surgical procedure. It is important, therefore, to establish definite critieria for determination of the optimal time for removal of such a tube.

At the Minneapolis Veterans hospital we employ the three criteria which have been suggested previously by Bergh.[3]

> (1) cholangiographic evidence that the biliary tree is structurally normal, that no filling defects suggestive of stone are present, and that the contrast medium empties readily into the duodenum; (2) direct evidence that the sphinc-

†Surgical resident, Minneapolis Veterans Hospital.

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ter resistance is normal and that the sphincter is not irritable; (3) subjective comfort of the patient, and lack of drainage around the tube when the catheter is clamped.

Before a choledochostomy tube may be removed it is essential that the patient be comfortable during periods when the tube is clamped. However, this simple clinical test in itself is not sufficient, for it is well known that stones may be present in the duct without obstructing bile flow and without producing symptoms. Likewise, we have demonstrated that the patient with an irritable sphincter of Oddi may, at times, tolerate closure of the choledochostomy tube without discomfort.

Cholangiograms are made in all cases in which a patient has a tube draining the common bile duct. A satisfactory cholangiogram is best obtained by the use of a nontoxic contrast medium having a watery consistency, miscible with bile. The hepatic ducts and the common duct should be filled, and the ease with which the contrast medium enters the duodenum should be observed. Cholangiograms are most important in the recognition of calculi or other duct obstructions, but also may reveal the presence of hepatic abscesses, and possibly spasm of the sphincter of Oddi, or stricture of the duct due to inflammatory reaction. In this connection, Royer[15] states that he is able to distinguish spasm from stricture on the basis that spasm gives eccentric narrowing of the duct shadow, while concentric narrowing is a finding in true stricture. Important as cholangiography is, it still leaves information to be desired concerning the condition of the sphincter of Oddi, whether it is in spasm, whether it is irritable and may be stimulated to contract in abnormal spasm, or whether it has normal tone. In order to evaluate this with any degree of accuracy it is necessary to conduct direct tests of the resistance of the sphincter of Oddi.

Although the technique of this test is simple, it is not yet in general use, and may therefore be described briefly. The apparatus required consists of an infusion flask connected to the open end of the choledochostomy tube by rubber tubing, incorporating a Murphy drip bulb in the system so that flow may be observed. The apparatus is sterilized, filled with saline solution, and air is evacuated from the system, save for the small air gap in the Murphy drip bulb. The flask is suspended from a standard, and arranged so that it may be elevated and lowered at will, thereby varying the pressure of the column of fluid in the system. Readings are taken directly on a centimeter scale suspended from the standard, and adjusted so that the zero point is placed at the estimated level of the common bile duct.

In carrying out the test, the infusion flask is elevated, then lowered to the point at which saline solution fails to run through the tubing. When this point is reached, the column of solution is supported without any flow in either direction, and the drop suspended in the Murphy bulb moves with the respiration of the patient. Elevation of the flask above this point allows saline solution to flow into the biliary tract, as evidenced by dripping solution through the Murphy drip bulb, and lowering the flask beyond this point causes reflux of fluid back into the infusion system. The level at which the column of saline solution is suspended without flow in either direction is taken as a measurement of the sphincter resistance. That this test is fairly delicate, in spite of the simplicity of the apparatus, is demonstrated by the marked changes produced by induced spasm, as when morphine is administered, or the flask suddenly elevated. Whenever practicable, the test is performed in the morning, after withholding breakfast, or at other times of the day, after a fasting period of four to eight hours, since it has been shown that ingestion of food lowers sphincter resistance—fatty foods having a marked effect, with less response to protein, and no effect after ingestion of carbohydrate.[4] The patient should not have received opiates prior to the test, since morphine, codein and related drugs produced spasm of the sphincter.[3]

By this technique, the resistance offered by the sphincter of Oddi has a normal range of 9 to 23 centimeters of water, with the ideal normal being 13 to 15 centimeters. Spasm of the sphincter may produce readings indicating a resistance of 30 to 40 centimeters of water, or more, and in these patients the resistance readings are usually more fluctuant than in normals. Irritability of the sphincter thus demonstrated is probably more commonly associated with organic pathologic condition such as an inflammatory process, or irritation caused by stone; but purely functional derangement (biliary dyskinesia or biliary dyssenergia) may also produce spasm.

From this, it is seen that by sphincter resistance tests we are able to tell, with a fair degree of accuracy, the condition of the sphincter of Oddi, in so far as tone and spasm are concerned, but this test gives no information as to the presence of stone or growth not causing obstruction, unless there be an associated irritability of the sphincter, as is often the case.

It has been the practice at the Minneapolis Veterans Hospital to judge the time for removal of the choledochostomy tube on the basis of these three criteria. If the patient tolerates clamping of the tube for twelve hours without discomfort, if the cholangiogram is normal, and if the sphincter is not irritable and the resistance is normal, the tube may be removed. In the usual uncomplicated case the cholangiogram may be done on the seventh to ninth day postoperatively, and the sphincter resistance test may be done the following day. The choledochostomy tube may, thefore, be removed in eight to ten days in the event of a normal response.

In the presence of an irritable sphincter, however, the choledochostomy tube should be left in place for longer periods of time. Prolonged decompression of the ducts by means of external drainage permits the sphincter to return gradually to normal. We have seen a number of cases in which this has occurred. The time required for the return of the sphincter to normal may be from several weeks to several months. However, if the still irritable, the patient is very likely to suffer recurrence of pain which may resemble biliary colic, or we have seen no patient in whom the criteria for remay be a vague epigastric distress. In contrast to this, choledochostomy tube is removed while the sphincter is moval of choledochostomy tubes have been satisfied who has had postcholecystectomy pain.

We may conclude, therefore, that we have available

three valuable criteria for judging the time when a choledochostomy tube may be removed, each of these having its own particular advantages and limitations. In recapitulation, clamping the tube is a clinical test of limited value, which gives little information as to the structural or physiological status of the duct system. Cholangiograms give a picture of the anatomical condition of the biliary ducts, but give little information concerning the condition of the sphincter. Since this condition of the sphincter is such an important consideration, direct measurement of the resistance of the sphincter of Oddi should be carried out. No single test furnishes sufficient information concerning the postoperative morphology and physiology of the biliary duct system, but by employing all three criteria we are able to gain valuable knowledge as to the condition of the ducts, the presence or absence of stones, the condition of the sphincter, and the tolerance of the patient to the existing conditions. The optimal time for removal of a choledochostomy tube may, therefore, be determined accurately by the use of these criteria.

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Discussion

DR. GEORGE BERGH: There is little to add to what Doctor Utendorfer has said. He has covered the subject very well from our point of view. The criteria have been of real value to us, and we employ them routinely.

DR. J. M. HAYES: I am wondering whether there are any statistics as to what was the average time for removing the tube.

DR. R. W. UTENDORFER: In the normal case, from eight to ten days.

DR. CARL RICE: I would like to ask Doctor Utendorfer and Doctor Bergh whether there are medications which will relieve the spasm of the sphincter? I notice morphine did not.

DR. R. W. UTENDORFER: The only drugs that have been found to be very effective on the sphincter are amyl nitrite and, to a lesser extent, nitroglycerine. There are some cases in which spasm of the sphincter is not relieved by amyl nitrite. Atropine and some of the usual spasmolytic agents have no effect. We are testing some of the newer ones at present, but cannot tell about them yet.

MASSIVE GASTRIC HEMORRHAGE DUE TO HEMORRHAGIC GASTRITIS NECESSITATING GASTRIC RESECTION

Case Report

G. H. HALL, M.D.†
Minneapolis, Minnesota

Surgical arrest of massive gastrointestinal hemorrhage continues to offer problems of major importance. This is particularly true when the vomiting of blood or the passage of large, bloody, loose and frequent stools occurs in a patient who presents practically no other symptoms or findings. Consideration of possible causes of the bleeding then becomes a matter of considerable concern.

Reports from most of the larger clinics indicate that ulcers of the stomach or duodenum are responsible for 90 per cent of upper gastrointestinal tract hemorrhages. The next most common cause, bleeding from esophageal varices, secondary to cirrhosis of the liver, has a reported incidence of from 2 to 5 per cent. Other less frequent causes of hematemesis and melena include carcinoma of the stomach or duodenum, benign tumors of the stomach, injuries to the stomach, blood dyscrasias, and ulceration in a Meckel's diverticulum.

Another possible source of massive bleeding from the upper gastro-intestinal tract, and one which has received little emphasis, is hemorrhagic gastritis. Bockus reports that in about one-fourth of the cases of massive hemorrhage into the upper gastrointestinal tract, roentgen study performed after the emergency is over fails to reveal an ulcer or other gastroduodenal lesion. Meyer and Steigmann[2] state that negative x-ray findings are reported in from 30 to 50 per cent of patients who have had gastric hemorrhage. Pathologists not infrequently have been unable to demonstrate at autopsy the source of bleeding in patients who have seemingly died of massive upper gastrointestinal hemorrhage. It should be recalled that post-mortem antolysis of the mucous membrane of the stomach occurs soon after death.

Examination of the stomach with the gastroscope has enabled visualization of areas of gastritis from which oozing of blood occurs and actual superficial ulcerations have been noted. It is not at all unlikely that a high percentage of the 25 to 50 per cent of patients who have negative x-ray findings after hemorrhage has subsided bleed from such lesions. As yet, the frequency of gastritis as a cause of massive upper gastrointestinal hemorrhage has not been determined. That it can occur and that it can cause massive bleeding has been emphasized to the staff at the Minneapolis Veterans hospital by experience with the following case.

Case History

The patient, a thirty-two-year-old veteran of World War II, was admitted to the medical service of the hospital on September 15, 1946. His presenting com-

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†Surgical resident, Minneapolis Veterans Hospital.

plaints were severe weakness and dizziness following the passage of large black liquid stools beginning three days prior to admission.

The patient's army career began in March, 1944, when he was assigned to the infantry. He had had no complaints referable to the gastrointestinal system until January, 1945, when he noticed a bloody stool. There were no other symptoms at that time. He was hospitalized in an army general hospital, where he apparently was studied thoroughly. A barium x-ray examination of the stomach was made, stools were examined, and he was put on various diets. After having been hospitalized for about a month, he was discharged to duty, but transferred from the infantry to the air corps, where he assumed the duties of a truck mechanic. He was told only that he had a "nervous stomach." He experienced no further appreciable difficulty during his remaining army service. The patient stated that he drank only very moderately and smoked about one package of cigarettes a day.

Fig. 1. Section taken through the linear lesion in the mucosa.

About one month prior to admission, he began to experience a dull aching distress, which he described as "bloating." This would begin in both flanks and gradually extend into the epigastrium, where it would remain. This distress usually occurred about one-half hour after meals and would be relieved somewhat by belching or by the ingestion of alkalis.

On the evening of September 12, three days prior to admission, he had a large bowel movement, consisting entirely of black liquid. Following this, he experienced severe cramping pains in the lower abdomen, which were relieved by two additional passages of black liquid. He became weak and experienced dizziness on walking or standing. On the following day, he continued to feel weak and dizzy. No nausea nor vomiting was experienced, however, and he was able to eat normally. The next day, defecation again produced a black liquid stool, and on September 15, another black liquid stool was passed. His family physician then was called and that same day he was sent to the hospital, where he was admitted with a tentative diagnosis of bleeding peptic ulcer.

Examination on admission revealed an unusually tall, slender, red-haired male. Although he was 6 feet 6 inches tall, the patient weighed only 140 pounds. There was noted a generalized, moderately severe pallor of the skin and mucous membranes. He appeared to be nervous and apprehensive. The temperature on admission was 99.2 Fahrenheit, the pulse rate 120 per minute and the blood pressure was 112 systolic and 60 diastolic in millimeters of mercury. The heart and lungs were normal to percussion and auscultation. The abdomen was flat and soft. No masses were palpated and no tenderness found. The liver and spleen were not enlarged. No other physical abnormalities were noted.

Fig. 2. Section through one of the smaller hemorrhagic areas. Note the large number of erythrocytes in the region of the muscularis mucosae, with break-through into the mucous membrane.

The hemoglobin on admission was 4.9 grams (31 per cent) and the red blood cell count was 1.6 million. The white blood cell count ranged from 6,000 to 11,000 and differential counts were within normal limits. The bleeding time was two and one-half minutes, the clotting time was six minutes, and the prothrombin time was thirteen seconds as compared with a normal control of thirteen seconds. Study of the blood morphology revealed findings consistent with a secondary anemia. Urinalyses showed no albumin, sugar, nor abnormal sediment, and specific gravities ranged from 1.009 to 1.024. Stool examinations consistently showed a four plus guaiac test for occult blood.

On admission to the medical service, the patient was placed on a regimen of strict bed rest and was given morphine. A nasal tube was introduced into the stomach and he was given a continuous drip of high caloric, high protein liquid diet night and day. Amphogel, ascorbic acid and vitamin K were added. Atropine sulphate, grains 1/100, was given every six hours. Daily transfusions of 500 cubic centimeters whole citrated blood were administrated by slow intravenous drip. After three days of this treatment, the patient felt much improved, the hemoglobin had risen to 9.7 grams (62 per cent) and the red blood cell count to 3.1 million. Nasal tube feedings were discontinued and hourly feedings of milk and cream alternating with amphogel were substituted. The first bowel movement during hospitali-

zation occurred two days after admission, however, and was definitely tarry.

Five days after admission, the patient suddenly became faint and vomited 900 cubic centimeters of bright red blood. 1,000 cubic centimeters of whole blood were given during the night, and the hemoglobin and red blood cell count the following morning remained at about the previous level. The hematocrit was 29 per cent. The blood pressure, which was checked hourly, remained at around 110 systolic and 70 diastolic, and the pulse at about 100 per minute. Surgical consultation was requested the following morning. Because the patient had not been in true shock and because the source of bleeding had not been determined, the decision was made to continue medical management in the hope that bleeding would subside so that a barium study of the upper gastrointestinal tract might enable localization of the bleeding area. Gastroscopy was considered, but deemed unwise. It was thought, however, that if further massive hemorrhage should occur, immediate surgical intervention should be undertaken.

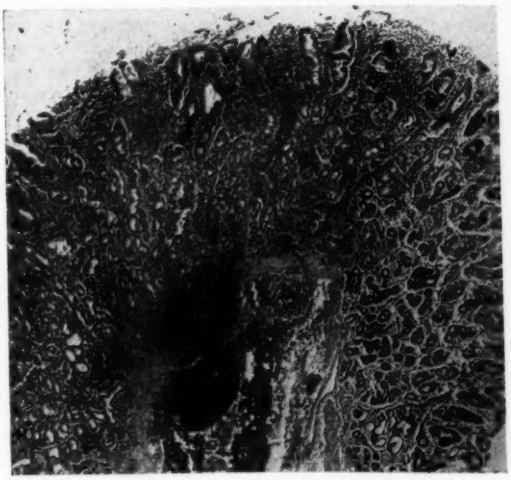

Fig. 3. Another section through a small hemorrhagic area. Erythrocytes have not broken through to any great extent.

The previously outlined medical management was continued. One definitely tarry stool was obtained by enema, but additional stools were reported to be lighter in color. Ten days following the episode of hematemesis, the medical resident was called at 3:30 a.m. because the blood pressure had dropped to 86 systolic and 55 diastolic. One unit of plasma followed by 500 cubic centimeters of whole blood restored the pressure to normal. It was found, however, that the hemoglobin had dropped to 6.7 grams (43 per cent) and the red blood cell count to 2 million for each cubic millimeter of blood in spite of the transfusion. Since hemorrhage appeared to be continuing despite eighteen days of active medical management, preparation for surgery was deemed advisable. Because it was feared that barium x-ray study or gastroscopy might cause further bleeding and because probabilities were in favor of a bleeding gastric, or duodenal ulcer, these diagnostic aids seemed contraindicated. The patient was given sufficient blood to raise the hemoglobin to 15.4 grams (98 per cent) and the red blood cell count to 4.5 million by continuous slow drip and laparotomy was performed nineteen days after admission. He had received a total of 7,500 c.c. of whole blood prior to operation.

Under intratracheal cyclopropane plus curare anesthesia, a left subcostal incision was made and the abdomen explored. The stomach was unusually large and elongated, and the stomach wall was edematous, but the serosal surfaces presented no evidence of scarring. The first portion of the duodenum was distended, but there was no deformity or scarring anteriorly and no adherence to the pancreas posteriorly. The small bowel was examined from the ligament of Treitz down to the terminal ileum. No abnormalities were noted except that black liquid, presumed to be blood, could be seen through the serosa beginning high in the jejunum. The colon also contained a large quantity of soft black material. Since no other cause for the hematemesis and melena could be established, it was decided that a small peptic ulcer was the most likely cause and that gastric resection should be done. The pyloric portion of the stomach and about four centimeters of the duodenum distal to the pylorus were first devascularized and the duodenum opened. The mucous membrane appeared to be normal and careful inspection failed to reveal the prescence of a bleeding point. The duodenum then was inverted with a running layer of chromic catgut re-inforced by a second layer of interrupted 0000 silk sutures. The inverted duodenal stump was buried into the capsule of the pancreas.

The greater curvature was devascularized up to and including the lower two vasa brevia and the lesser curvature to the left gastric artery. About 75 per cent of the stomach was removed and a Hofmeister type of short-loop, retrocolic gastro-jejunostomy performed, using the Wangensteen aseptic technique.

Upon opening the resected stomach, the pathologist found no ulcer present. The mucosa of the stomach was thrown into normal appearing rugae except in the pyloric antrum, where it was smoother. On the posterior wall of the fundal portion of the stomach, there was noted a linear defect in the mucosa measuring 2 centimeters in length and up to 3 millimeters in diameter. The defect was shallow, dark red, and presented irregular borders. In addition, other sections showed occasional tiny hemorrhagic foci within or just beneath the mucosa.

Some doubt remained as to the source of the hemorrhage, however, until miscroscopic studies were made. Sections through the linear lesion in the mucosa showed complete dissolution in continuity of the mucous membrane extending into the muscularis mucosa and possibly into the deeper muscle layers. There was a dense infiltration of extravasated blood. Sections through the smaller hemorrhagic areas revealed massive aggregations of erythrocytes, most densely collected in the muscularis mucosa. In some instances, there seemed to be actual necrosis of this muscular layer. There was definite edema between the muscular layers and in the connective tissues. Furthermore, inflammatory cellular exudate, and mild scatterings of eosinophiles, polymorphonuclear cells and lymphocytes, was noted in the vicinity of the lesions. The diagnosis of the pathologist was subacute diffuse gastritis with focal mucosal and submucosal hemorrhages.

The postoperative course was without complication. No further melena or hematemesis occurred, and no more blood transfusions were necessary. Gastric analysis postoperatively proved the patient to be achlorhydric to histamine. Barium radiographic examination revealed no abnormality of the esophagus or residual pouch, and barium passed readily into the small bowel. The patient was seen subsequently one month after surgery. There had been no recurrence of his previous symptoms. He stated at that time that he had been feeling fine, had been eating well, and had gained about 10 pounds in weight.

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(Continued on Page 339)

Reports and Announcements

MEDICAL BROADCAST FOR MARCH

The following radio schedule of talks on medical and dental subjects by William O'Brien, M.D., Director of Postgraduate Medical Education, University of Minnesota, is sponsored by the Minnesota State Medical Association, the Minnesota State Dental Association, the Minnesota Hospital Service Association in co-operation with the Minnesota Hospital Association and the Minnesota Nurses Association, and the University of Minnesota School of the Air.

1	11:30 A.M.	KUOM-KROC-KFAM-	Medicine in the News
4	9:00 A.M.	WCCO	The Code of Medical Ethics
5	11:00 A.M.	KUOM	We Inherit Some Traits But We Acquire Others
7	9:00 A.M.	WCCO	Pneumonia
8	11:30 A.M.	KUOM-KROC-KFAM-	Medicine in the News
11	9:00 A.M.	WCCO	Industrial Nursing
12	11:00 A.M.	KUOM	Stimulants and Narcotics Can Be Very Harmful
13	9:00 A.M.	WCCO	Influenza
15	11:30 A.M.	KUOM-KROC-KFAM-	Medicine in the News
18	9:00 A.M.	WCCO	Rural Health and Nursing
19	11:00 A.M.	KUOM	Self-Prescribed Medicine Can Be Most Injurious
20	9:00 A.M.	WCCO	Speech Disorders in Childhood
22	11:30 A.M.	KUOM-KROC-KFAM-	Medicine in the News
25	9:00 A.M.	WCCO	Conservation of Vision
26	11:00 A.M.	KUOM	Your Mental Outlook Can Help or Hinder
27	9:00 A.M.	WCCO	Mouth Infections
29	11:30 A.M.	KUOM-KROC-KFAM-	Medicine in the News

PRIZE CONTEST ANNOUNCED

The American Association of Obstetricians, Gynecologists and Abdominal Surgeons announces a Foundation prize contest.

Further information may be obtained from Dr. James R. Bloss, secretary, 418 Eleventh Street, Huntington 1, West Virginia.

E. STARR JUDD LECTURE

The fourteenth E. Starr Judd lecture will be given by Dr. I. S. Ravdin, John Rhea Barton Professor of Surgery at the University of Pennsylvania, Tuesday evening, April 15, 1947, at 8:15 in the Auditorium of the Museum of Natural History. Doctor Ravdin's subject is "Changing Concepts in Surgical Care."

The late E. Starr Judd, an alumnus of the Medical School of the University of Minnesota, established this annual lectureship in surgery a few years before his death.

AMERICAN COLLEGE OF CHEST PHYSICIANS

The thirteenth annual meeting of the American College of Chest Physicians is scheduled to be held at the Ambassador Hotel, Atlantic City, New Jersey, June 5 to 8. An interesting scientific program has been planned for this meeting. Prominent speakers from other countries will present papers.

The oral and written examinations for Fellowship will be held on the first day of the meeting, June 5. Applicants for Fellowship in the College who plan to take these examinations should communicate *at once* with the Executive Secretary, American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

The convocation for new Fellows and Life Members of the College will be held on Sunday, June 8. At this time certificates will be awarded to Fellows and Life Members admitted since June, 1946.

AMERICAN SOCIETY FOR THE STUDY OF STERILITY

The third annual convention of the American Society for the Study of Sterility will be held at the Hotel Strand, Atlantic City, New Jersey, on June 7 and 8, 1947, preceding the annual AMA Convention. The general theme of the meetings will be that of attempting to disseminate to the physician treating marital infertility an over-all picture of the latest advances in reproduction. The convention will include original papers, round table discussion, scientific exhibits, and personal demonstrations. Registration for the sessions is open to members of the medical and allied professions.

Additional information may be obtained from the secretary, Dr. John O. Haman, 490 Post Street, San Francisco 2, California.

INDUSTRIAL HEALTH MEETINGS

A conclave of combined professional personnel in industrial health work over the entire nation will take place at the Hotel Statler, Buffalo, N. Y., April 26 through May 4, 1947.

These meetings will represent the 32nd annual gathering of the American Association of Industrial Physicians and Surgeons; the ninth annual conference of the American Conference of Governmental Industrial Hygienists; the eighth annual meeting of the American Industrial Hygiene Association; the fifth annual conference of the American Association of Industrial Nurses, and the fourth annual meeting of the American Association of Industrial Dentists.

The sessions will be replete with many new subjects of interest, including among others, round table discussions for chemists, engineers, physicians and nurses; a symposium on new problems in the developments of industrial hygiene; a discussion of state codes and industrial hygiene administration; conferences on environmental control, on particle size, and analytical procedures; clinics on fractures and traumatic surgery, including a symposium on back problems; hazards incident to the use of the atomic bomb; reports on the Bikini experiments with motion pictures; tracer chemistry in toxicological research and experience with range finding tests; progress in the teaching of industrial medicine in Amer-

(Continued on Page 322)

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INDUSTRIAL HEALTH MEETINGS

(Continued from Page 320)

ican medical schools; the development and administration of industrial dental clinics in various industrial groups; a panel discussion on new preventive measures in industry; a panel discussion on in-service education of the nurse in industry, and many other subjects which can be found by consulting the preliminary program.

Further details and copy of the preliminary program may be secured by writing to Dr. Edward C. Holmblad, Managing Director of the American Association of Industrial Physicians and Surgeons, 28 East Jackson Blvd., Chicago 4, Illinois.

All hotel reservations are made by the Housing Bureau, Buffalo Convention and Tourist Bureau, Inc., 602 Genesee Bldg., Buffalo, N. Y.

DAKOTA COUNTY SOCIETY

All officers of the Dakota County Medical Society were re-elected for 1947 at the annual meeting on January 28 at the Gardner Hotel in Hastings. Dr. Albert J. Emond, Farmington, was retained as president; Dr J. A. Sanford, Farmington, vice president, and Dr. L. R. Peck, Hastings, secretary-treasurer.

The society elected a cancer committee to co-operate with the state and national cancer organizations, naming Dr. A. J. Emond as chairman, and Drs. Leo Burns, South Saint Paul, and L. R. Peck as committee members.

HENNEPIN COUNTY SOCIETY

At a meeting on February 3, it was announced that Dr. Ralph H. Creighton, Minneapolis, had been elected president of the Hennepin County Medical Society. He will take office in October.

Dr. Robert L. Wilder and Dr. William P. Sadler were named vice presidents; Dr. Charles A. Aling, secretary-treasurer, and Dr. Thomas Lowry, librarian. Members elected to various boards are: Drs. Willard D. White and John H. Moe, board of directors; Drs. Edwin G. Benjamin and Otto W. Yoerg, board of censors; Drs. S. Marx White and Vernon L. Hart, board of ethics; and Drs. Henry L. Ulrich and James K. Anderson, board of trustees, Drs. Kenneth Bulkley, O. J. Campbell, Richard H. Crammer and Donald McCarthy were elected delegates to the State Medical Association.

The program for the meeting featured a talk by Dr. Donald W. Hastings, head of the University of Minnesota psychiatry and neurology department, who spoke on "Psychotherapy in General Practice."

McLEOD COUNTY SOCIETY

At the annual meeting of the McLeod County Medical Society, held January 9 at Glencoe, Dr. C. W. Truesdale, Glencoe, was elected president, and Dr. John W. Gridley, Glencoe, secretary. A resolution was passed endorsing the national drive for the infantile paralysis fund.

MINNESOTA SURGICAL SOCIETY

Dr. C. W. Mayo, Rochester, was elected president of the Minnesota Surgical Society at the organization's first postwar meeting, held in Rochester on January 31. The society last met in 1941, when it was decided to discontinue meetings for the duration of the war.

Also elected to office at the January meeting were Dr. O. J. Campbell, Minneapolis, vice president, and Dr. Malcolm G. Gillespie, Duluth, secretary-treasurer.

During the morning session of the one-day meeting, the group was addressed by Drs. M. B. Dockerty and B. T. Horton, Rochester. At the afternoon session, papers were presented by Drs. F. R. Keating, J. H. Grindlay, J. C. Cain, Hiram E. Essex, H. Waltman Walters, S. W. Harrington and F. Z. Havens, all of Rochester.

A dinner was given at the Mayo Foundation House for the society in the evening.

STEARNS-BENTON COUNTY SOCIETY

Dr. Gilman H. Goehrs, St. Cloud, was elected president of the Stearns-Benton County Medical Society at a meeting held in St. Cloud on January 23. Dr. A. H. Zachman, Melrose, was named president-elect for 1948 and also a delegate for 1947.

Others elected to office were Dr. F. H. Baumgartner, Albany, vice president; Dr. John N. Libert, St. Cloud, secretary-treasurer; Dr. R. N. Jones, St. Cloud, alternate delegate, and Dr. S. J. Raetz, St. Cloud, advisory committee chairman.

Dr. Rodney Sturley, Saint Paul, was principal speaker at the meeting, discussing the use of hormones.

The society voted to sponsor the annual essay contest for junior and senior high school students on the subject, "Why Private Practice of Medicine Furnishes This Country with the Finest in Medical Care."

WASECA COUNTY SOCIETY

Re-elected as president, Dr. George H. Olds, New Richland, was chosen to head the Waseca County Medical Society for another term, at the annual meeting held at Hotel Waseca on January 7. Dr. H. M. McIntire, Waseca, was elected vice president, and Dr. S. C. G. Oeljen, Waseca, secretary-treasurer.

The society and the ladies auxiliary, which held its annual meeting at the same time, were entertained at a dinner at the hotel by Dr. and Mrs. Clifford T. Wadd, Janesville.

WASHINGTON COUNTY SOCIETY

The Washington County Medical Society held its regular monthly meeting on February 11. Following a business discussion, a colored motion picture entitled "Intocostrin" was shown through the courtesy of E. R. Squibb and Sons.

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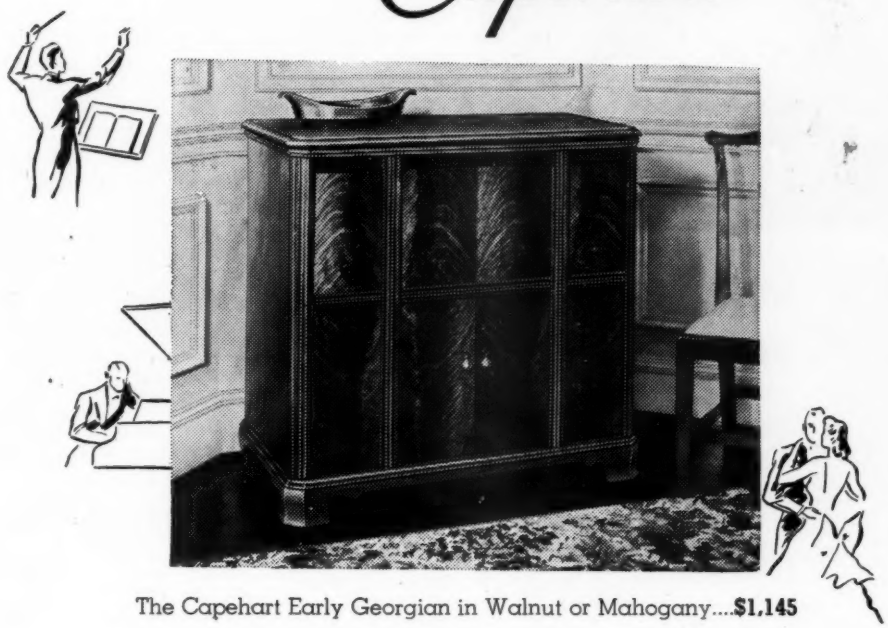

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WOMAN'S AUXILIARY

Blue Earth, Redwood-Brown and Nicollet-Le Sueur Counties

A joint dinner meeting of the medical societies and auxiliaries of Blue Earth, Redwood-Brown and Nicollet-Le Sueur Counties was held on January 20, 1947 with the Nicollet-Le Sueur group as hosts. There was a very large attendance.

Dr. Robert L. Wilder of Minneapolis addressed the group and Dr. Robert N. Barr of the Minnesota State Health Department spoke on the cancer problem and its control.

After the program the various societies and auxiliaries had their individual meetings.

Auxiliary members discussed *Hygeia*, pending legislation and the cancer essay and poster contests.

Hennepin County

The February meeting of the Hennepin County Medical Auxiliary was held February 7, 1947 at the Medical Arts Lounge, Minneapolis.

Dr. Donald W. Hastings of the department of psychiatry at the University of Minnesota talked on "Certain Types of Emotional Illness."

Mrs. John H. Moe was tea chairman for the day, and Mrs. Jalmer H. Simons served as hospitality chairman.

Ramsey County

The January Meeting of Ramsey County Medical Auxiliary was held at the home of Mrs. A. A. Kugler, 1368 Edgcumbe Road, Saint Paul.

Mr. Douglas K. Baldwin of the American Red Cross had as his topic, "Let Us Not Take It for Granted" and Richard Enquist of Saint Paul played a group of violin selections.

Tea followed the program with Mrs. Charles Waas and Mrs. E. C. Bohland pouring.

Awards were presented to two winners of essays on tuberculosis in a contest conducted as part of the Christmas Seal Program—Delores Carley of White Bear High School and Irma Artell of Mechanic Arts High School, Saint Paul.

Upper Mississippi

At a dinner meeting of the Upper Mississippi Medical Auxiliary held January 25, 1947, the following officers were elected: Mrs. A. J. Lenarz, Browerville, president; Mrs. I. L. Mitby, Aitkin, president-elect; Mrs. Virgil Quanstrom, Brainerd, vice president; Mrs. A. M. Mulligan, Brainerd, secretary, and Mrs. A. N. Borgerson, Long Prairie, treasurer.

The state cancer society and county nursing projects were discussed at this meeting. Mrs. J. A. Thabes, Sr., State president-elect, reported on the national auxiliary board meeting held recently in Chicago.

The tuberculosis essay contest, sponsored by the auxiliary was very successful. A number of state winners were residents of the Upper Mississippi territory.

The auxiliary voted contributions to the Red Cross, Christmas Seals and the State Cancer Society.

The advice is always "SEE YOUR DOCTOR"

For over 18 years, Parke, Davis & Company has conducted an educational advertising campaign in behalf of the medical profession — teaching the importance of prompt and proper medical care. Now appearing in color in LIFE and other leading magazines, these "See your doctor" messages reach an audience of *more than 23 million people.*

Some things you should know about heart disease

No. 202 in a series of messages from Parke, Davis & Co. on the importance of prompt and proper medical care.

IT IS true that heart disease is the greatest single cause of death in this country.

But it is not true, as many people think, that heart disease must automatically cut short your life or make you an invalid.

A common type of heart disease—the so-called "functional" type—is not actually heart disease at all. It is the reflection of some other, usually correctable, disturbance in the body. It is often merely a temporary condition. It does not alter the heart itself, nor does it shorten life.

Even "organic" heart disease, which actually changes the heart's structure, need not be a serious disability. The handicap it imposes on a normal life will vary widely —with the nature of the disease and the individual case.

Symptoms are no indication of the seriousness of a heart condition.

Two men may have identical symptoms. One man's heart condition may dictate a careful limitation of his activities. The other man may be able to live a normal life span with only slight restrictions on his way of living.

Medical science during the past few years has made great progress in understanding the nature of heart disease, and in developing new methods of prevention and treatment.

Doctors today, by proper treatment of rheumatic fever in children, prevent many future cases of heart disease. And today doctors can also *cure* some cases of heart disease which would have been considered hopeless a few years ago.

There is, for instance, a kind of heart disease known as subacute bacterial endocarditis. A few years ago doctors were helpless in combatting what was practically always a fatal infection. But now, through the use of penicillin, an increasing number of cases are being successfully treated.

Other drugs help your doctor to regulate the action of an irregular heart and to reduce the strains that are put upon it.

And his modern knowledge of diet and vitamins, and the prevention of anemia and acute respiratory infections gives him other weapons to use against progressive heart disease.

SEE YOUR DOCTOR. If at any time you find yourself wondering: "Is there something wrong with my heart?" . . . see your doctor at once.

If he finds your heart in good condition, an enormous load will be lifted from your mind. And if something should be wrong, your doctor's prompt diagnosis and treatment give you the best chance for living a long and normal life.

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In Memoriam

CLARENCE MARTIN JACKSON

Dr. Clarence Martin Jackson, professor emeritus of anatomy and former head of the department at the University of Minnesota, died January 17, 1947, of Parkinson's disease after a long disabling illness. He retired from the University in 1941 before the completion of his term of service because of his disability.

Dr. Jackson was born in WhatCheer, Iowa, April 12, 1875 and was seventy-one years old at the time of his death. He received the B.S., M.S., and M.D. degrees from the University of Missouri, and in 1923 he was awarded the LL.D. degree by the University of Missouri in recognition of his services to education.

Shortly after receiving his M.D. degree, Dr. Jackson was made professor of anatomy and head of the department at the University of Missouri, and later he was appointed dean of the medical school. In 1913 he accepted the appointment as head of the Department of Anatomy at the University of Minnesota, which position he held until his retirement in 1941.

Dr. Jackson was long recognized as a leader in medical research. He was acting dean of the graduate school at Minnesota for several years while Dean Ford was on leave of absence; and in 1923-24 he was chairman of the Medical Division of the National Research Council. He was a fearless champion of research during the trying period when the Minnesota Medical School was being transformed from an ordinary medical college to the brilliant teaching and research position which it has now attained. Only those of the faculty who were here during that period realize the courage and tact which he constantly displayed in bringing about each small advance to a higher level of scholarship.

During a large part of his active life Dr. Jackson was interested in the effects of nutrition upon growth, and his earlier extensive investigations were summarized in 1925 in his book entitled "The Effects of Inanition and Malnutrition upon Growth and Structure."

During the next five years he extended these interests to a study of body build and physique in university students, and much of this work was incorporated in a book in 1930, jointly published by J. A. Harris, C. M. Jackson, D. G. Patterson and R. E. Scammon, entitled "The Measurement of Man."

In the next decade he returned to his earlier interests, analyzing especially the effect of protein and fat-deficient diets on growth. Also, these years were increasingly occupied by his contribution to the teaching of anatomy. In 1933, the ninth edition of Morris Human Anatomy was published under his editorship and he was working on the tenth edition when obliged to turn it over to another because of ill health. Finally, just as he retired, his monumental Report (to the American Association of Anatomists) of the Committee on Anatomical Nomenclature, of which he was chairman, was published. In 1922-24 he had been president of the Association.

The local chapter of Phi Beta Pi medical fraternity, of which Dr. Jackson was a member, has for several years sponsored an annual lecture called the "Jackson Lecture," in which many distinguished scientists have participated.

In the death of Dr. Jackson the Medical School has lost one of its most distinguished professors, and one who will long be remembered lovingly by the hundreds of students who came under the influence of his teaching.

E. T. Bell

CHEST X-RAY SURVEY

A program unique in the history of health service is being planned for this spring and summer in Minneapolis. Every resident over fifteen will be given the opportunity for a free chest x-ray.

Three mobile x-ray units and seven portable units will be in operation at the same time in various locations in the city beginning May 5. No one will walk more than four blocks for a chest x-ray. Employes in industries which have not already taken advantage of this service will be able to have an x-ray at the plant.

The purpose of this health program is to locate unsuspected cases of tuberculosis, cancer of the lung and heart diseases, according to Dr. Frank J. Hill, city Commissioner of Health.

The program is being sponsored by the Hennepin County Medical Society and the Hennepin County Tuberculosis Association. It is being directed by the Minneapolis Health Department with the co-operation of the U. S. Public Health Service.

The Mary E. Pogue School

Complete facilities for training Retarded and Epileptic children educationally and socially. Pupils per teacher strictly limited. Excellent educational, physical and occupational therapy programs.

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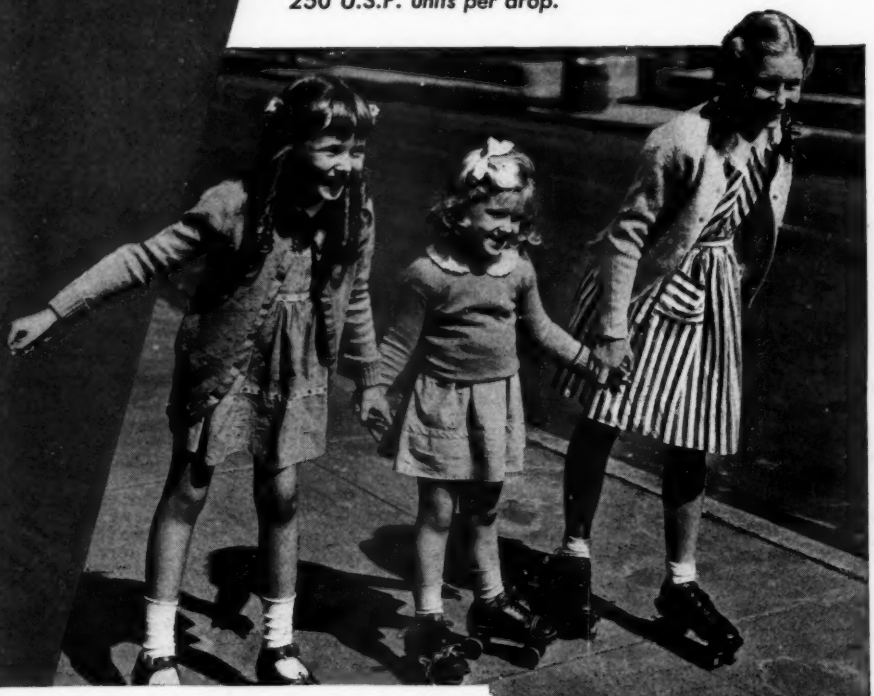
Average daily dose for infants 2 drops, for children and adults 4 to 6 drops, in milk. Available in bottles of 5, 10 and 50 cc. with special dropper delivering 250 U.S.P. units per drop.



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Of General Interest

Dr. H. P. Van Cleve, formerly of Minneapolis, is now located at Dodge Center.

* * *

Drs. A. E. Henslin and Merrill Henslin have moved into a newly furnished suite of offices in Le Roy.

* * *

Dr. C. F. Medlin, Truman, recently moved into his newly constructed office building and is conducting his practice there.

* * *

Dr. F. J. Kucera, Hopkins, attended the twentieth annual convention of the National Conference on Medical Service held in Chicago in February.

* * *

Dr. Paul R. Lipscomb, Rochester, attended the Watson-Jones Fracture Clinic held recently in Chicago under the auspices of the University of Kansas.

* * *

Dr. Frederick Gunlaugson, Moorhead, formerly with the Fargo Clinic, has joined the staff of the state hospital in Fergus Falls. Mrs. Gunlaugson, the former Dr. Eleanor Iverson, was once a member of the same staff.

Dr. Albert V. Stoesser is now located in a new office at 1409 Willow Street, Loring Park, Minneapolis, where he is continuing his practice in allergy and pediatrics.

* * *

Dr. Thomas L. Pool, Rochester, discussed "Some of the Common Errors in Urology" at a meeting of the Ramsey County Medical Society in Saint Paul.

* * *

Dr. E. V. Allen, Rochester, spoke on the clinical use of anticoagulants at a meeting of the Cincinnati Academy of Medicine.

* * *

Dr. Harold N. Rygh, who practiced for a short time in Cokato following his discharge from military service, recently moved to Atwater and opened offices there.

* * *

Opening of a new office in downtown Jackson has been announced by Drs. W. H. Halloran and W. B. Wells of that city.

* * *

Dr. Joseph F. Schaefer, Owatonna, was unanimously elected president of the Steele County Mass X-Ray Committee at the organization meeting held in Owatonna.

(Continued on Page 330)

The Stethetron

By

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A REMARKABLE development which assures accuracy in auscultatory diagnosis.

An electronic stethoscope which amplifies the faint heart and chest sounds you wish to hear while subduing the other sounds to convenient levels for comparison.

Easily detects faint murmurs and disease sounds which cannot be heard through the old-fashioned acoustic stethoscope.

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Shambaugh, G. E., Jr.: J. Iowa M. Soc. 31:373.

Wide margin of safety Benzedrine Inhaler, N. N. R., is strikingly effective in reducing the congestion accompanying head colds, allergic rhinitis and sinusitis, but it does not give rise to any significant degree of secondary turgescence, atony, or bogginess, when used as directed.

Each Benzedrine Inhaler is packed with racemic amphetamine, S. K. F., 250 mg.; menthol, 12.5 mg.; and aromatics.

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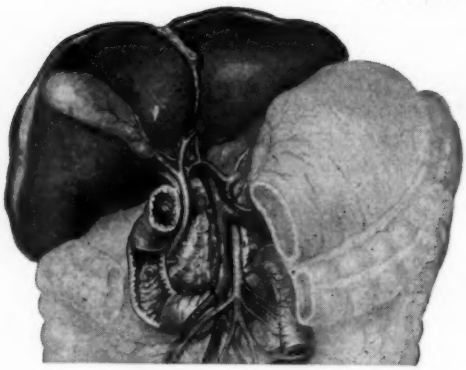

In Cholangitis . .

Decholin produces hydrocholeresis, flushing the bile ducts, removing accumulated mucus and inspissated bile.

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Decholin fits well into the postoperative routine by materially helping to keep the bile passages free from offending debris.

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Successors to Riedel-de Haen, Inc.
ELKHART, INDIANA

(Continued from Page 328)

Dr. Henry Van Meier, Stillwater, was reappointed county physician at a meeting of the Washington County commissioners in January.

* * *

Dr. O. V. Johnson, Fergus Falls, has accepted a position as medical consultant in the legal department of the Veterans Administration in Minneapolis.

* * *

Dr. W. W. Brown, who has been with the Veterans Bureau in Minneapolis for the past fourteen years, has moved to Isle where he has opened his practice.

* * *

Dr. L. G. Smith, Montevideo, was one of the twenty-one Minnesota physicians who recently incorporated the Minnesota Medical Service, a nonprofit organization for voluntary prepaid medical care.

* * *

Dr. Chester A. Anderson, formerly of Buffalo, who was recently discharged from the armed forces, has moved to Winsted where he has opened an office for the practice of medicine.

* * *

Dr. T. H. Leitschuh, formerly of Sleepy Eye, has become an associate of Dr. J. A. Cosgriff in Olivia. Since his discharge from the navy after three years of service, Dr. Leitschuh has lived in Minneapolis.

* * *

Two lectures were delivered by O. T. Clagett, Rochester, at a postgraduate course at the George Washington University School of Medicine in Washington, D. C. Dr. Clagett spoke on "Surgery of the Pancreas" and "Recent Advances in Surgery of the Biliary Tract."

* * *

On February 8 in Chicago Dr. John D. Camp, Rochester, presided at the fourteenth annual conference of the Teachers of Clinical Radiology, sponsored by the Commission on Education of the American College of Radiology, of which Dr. Camp is chairman.

* * *

Dr. John M. Waugh, Rochester, presented two papers at a meeting of the Sioux Valley Medical Association, in Sioux City, Iowa. His subjects were "The Acute Conditions of the Abdomen" and "Management of Pelvic Tumors."

* * *

Drs. W. M. Balfour and W. L. Benedict, Rochester, have been named members of the Board of Governors of the American College of Surgeons. Dr. G. B. New, also of Rochester, has been named second vice president of the organization.

* * *

Both Dr. Richard Magraw and Dr. R. F. Mueller, Two Harbors, have discontinued their practice in Lake County. Dr. Magraw has moved to Saint Paul. Dr. Mueller has been enjoying a two-month vacation and has not yet announced his future plans.

(Continued on Page 332)

The sick or injured patient is almost simultaneously subjected to two traumas—the basic pathologic process and tissue malnutrition—for malnutrition almost always begins "as soon as injury or disease occurs."[1] Recognition of the vitamin depleting role of dietary restrictions, increased metabolism, glucose infusions, and impairment of absorption, has brought with it the realization that vitamins must be administered in therapeutic—not maintenance—dosages when multiple deficiencies complicate disease. Upjohn provides a full range of maintenance and therapeutic vitamin preparations for oral and parenteral administration.

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(Continued from Page 330)

Formation of the Montevideo Clinic took place in January through the association of Dr. L. R. Lima, Jr., and Dr. W. A. Owens, Montevideo. Their now-combined offices have been remodeled and a considerable amount of new equipment has been installed.

* * *

Dr. F. M. McCarten, Stillwater, was appointed coroner by the Washington County commissioners on February 4. A deputy coroner for several years, Dr. McCarten succeeded Dr. J. H. Haines, who had resigned from the office.

* * *

Principal speaker at a meeting of the Arrowhead Society of Medical Technologists, Duluth, was Dr. W. V. Knoll, pathologist at St. Mary's Hospital. Dr. Knoll discussed a color film, "Animated Hematology," which dealt primarily with the blood and bone findings in macrocytic anemias.

* * *

Dr. J. S. Blumenthal, Minneapolis, has been elected chief of staff of St. Andrew's Hospital. Dr. Blumenthal, a practicing physician and surgeon in the Columbia Heights district of Minneapolis for over twenty years, is also an assistant clinical professor of medicine at the University of Minnesota.

* * *

Dr. J. L. Mills, Winnebago, was a member of a delegation which visited Saint Paul in January to get information from the State Board of Health in regard to state recommendations as to hospital building. A hospital drive is planned by Winnebago citizens for this spring.

* * *

Dr. W. R. Lovelace II, Rochester, has announced his resignation from the staffs of the Mayo Clinic and Mayo Foundation to continue the practice of his uncle in Albuquerque, New Mexico. While at the Mayo Clinic, Dr. Lovelace did experimental work with the BLB mask in high altitude flying.

* * *

Dr. C. Anderson Aldrich, Rochester, pediatrician at the Mayo Clinic, spoke on the Rochester child health project at a meeting of the Minneapolis Community Health Service, February 10. Dr. Aldrich also recently addressed the American Orthopsychiatric Association in Cincinnati on "The Pediatrician Looks at Personality."

* * *

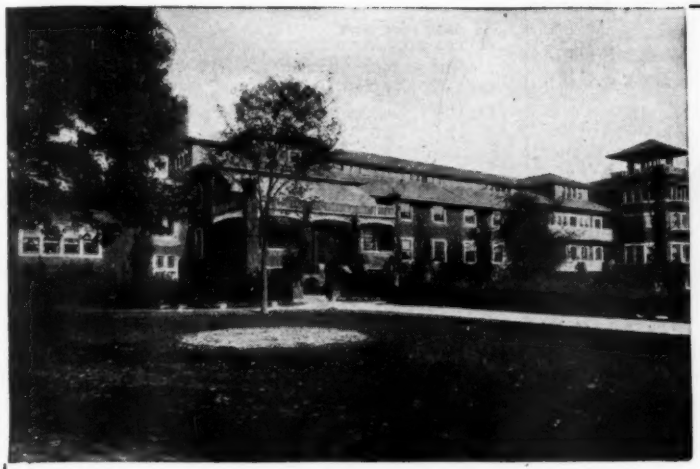
Announcement has been made by the Doms-Pierson Clinic, Slayton, of the recent entry of Dr. Richard M. Johnson into the partnership.

Dr. Johnson, a graduate of the University of Nebraska School of Medicine in 1942, was formerly at Manning, Iowa, after completing a tour of service in the navy.

* * *

Dr. Myron O. Henry, Minneapolis, was named president-elect of the American Academy of Orthopedic Surgeons at a recent meeting in Chicago. Dr. Henry,

(Continued on Page 334)



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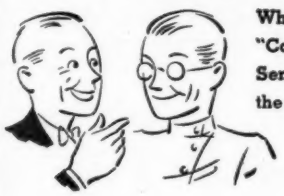

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(Continued from Page 332)

who is president of the Clinical Orthopedic Society and present secretary-treasurer of the Academy, will assume his new office in January, 1948, succeeding Dr. Rex L. Diveley, New York.

* * *

Dr. Walter C. Alvarez, professor of medicine at the Mayo Foundation, Rochester, spoke at the thirty-seventh annual meeting of the Jewish Family and Children's Service of Minneapolis, held February 19 at the Radisson Hotel in Minneapolis. An internationally recognized authority on psychosomatic medicine, Dr. Alvarez discussed "What Makes People Sick."

* * *

Dr. W. E. Macklin, Jr., Litchfield, joined the staff of the Mankato Clinic on March 1 as radiologist. A physician in Litchfield for twelve years, Dr. Macklin served in the navy in World War II. Since his discharge, he has been taking graduate work in the Department of Radiology at the University of Minnesota. He recently passed the examination of the American Board of Radiology.

* * *

Dr. Waltman Waters, Rochester, and Dr. Shields Warren, assistant professor of pathology, Harvard Medical School, have been appointed to serve on the National Advisory Cancer Council by Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service. Dr. Walters was first appointed to the Council in 1941, but service in the navy interrupted his connection with the Council.

* * *

On January 20, 1947, Drs. Robert E. Priest, Lawrence R. Boies and Neill F. Goltz presented a paper at the Middle Section meeting of the American Laryngological, Rhinological and Otological Society in Chicago. The paper summarized the experiences at the University of Minnesota Hospitals and the Minneapolis General Hospital with tracheotomy in bulbar poliomyelitis during the epidemic of 1946.

* * *

Dr. Alfred S. Nelson, Thief River Falls, has become affiliated with the Bratrud Clinic of that city, specializing in internal medicine. A graduate of the University of Minnesota Medical School in 1943, Dr. Nelson interned at Ancker Hospital, Saint Paul, and then served for twenty-six months in the army medical corps. His major assignment was at a general hospital in Manila, Philippine Islands.

* * *

Dr. Robert M. Watson, formerly of Royalton, is now affiliated with the Bratrud Clinic in Thief River Falls, in the capacity of obstetrician and gynecologist. Following graduation from the University of Minnesota Medical School and internship at Miller Hospital, Saint Paul, Dr. Watson served for eighteen months in the army medical corps. While stationed at Lovell General Hospital, Fort Devens, Massachusetts, he was assistant chief of surgery in charge of obstetrics and gynecology.

Under the subsidization of the Hennepin County Tuberculosis Association, a broad new health program is being launched in Minneapolis public schools, with Helen Starr, associate professor of physical education at the University of Minnesota, as director.

In addition to handling accident and emergency cases, the health program includes careful control of communicable diseases, emphasis on physical education for every child in school, and intensified health instruction.

* * *

"Cicatricial Stenosis of the Nasopharynx: Correction by Means of a Skin Graft" was the subject of a talk by Dr. F. A. Figi, Rochester, before the Southern Section of the American Laryngological, Rhinological and Otological Society, at a meeting in Miami Beach, Florida. While in Florida, Dr. Figi also presented two papers at the midwinter postgraduate course in otolaryngology and ophthalmology held by the Graduate School of Medicine of the University of Florida.

* * *

Offices have been opened at the Two Harbors Hospital by Dr. Ralph Papermaster and Dr. Harry N. Simmonds. Dr. Papermaster, who is specializing in surgery, was a surgical resident at Minneapolis General Hospital for three years, and served as head of an army surgical team in the European theatre for two years. Dr. Simmonds, who will do general practice, interned at Columbus Hospital in New York City and then served for two and one-half years in the army medical corps.

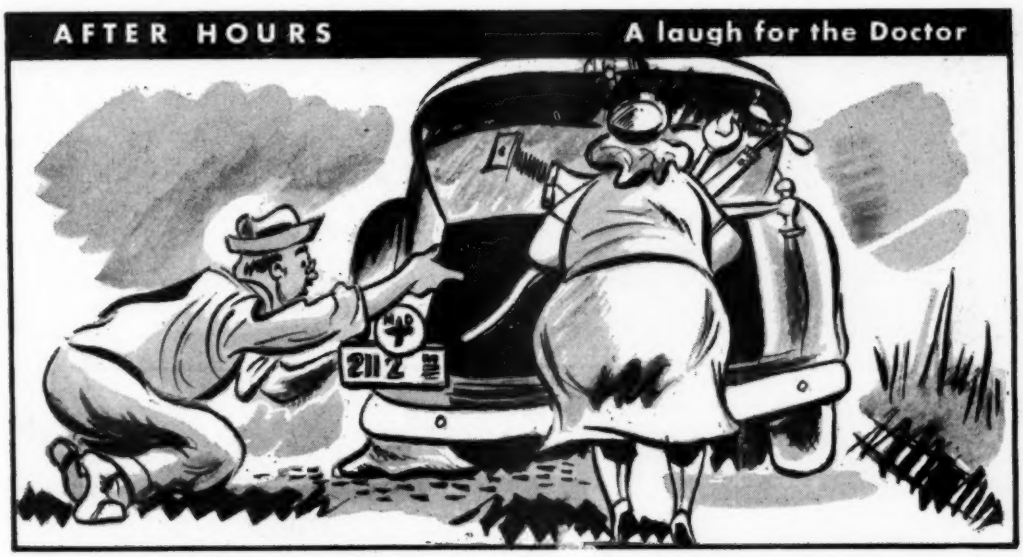
Dr. Ward Norton Van Potter and Dr. Viola Ellen Sheridan, both of whom hold Fellowships at the Mayo Clinic, were married on December 28, 1946, in Rochester. Dr. Sheridan, a graduate of the Medical College of Creighton University, Omaha, Nebraska, interned at the Women's and Children's Hospital in San Francisco. Dr. Potter, a graduate of the Medical College of the University of Toronto, Ontario, interned at the General Hospital in Montreal, Quebec, Canada.

* * *

Dr. Francis E. Harrington, former superintendent of Minneapolis General Hospital and former commissioner of Minneapolis, was praised in an article in a recent issue of the *Journal-Lancet* for building an outstanding anti-tuberculosis program for Minneapolis. The article, written by Dr. J. A. Myers, professor of public health at the University of Minnesota, states: "Under Dr. Harington's leadership, tuberculosis has reached such a low ebb in Minneapolis that workers are beginning to talk about eradication, rather than control of the disease."

* * *

CORRECTION—In the announcement of the opening of the offices of Dr. Frank W. Quattlebaum and Dr. Jane E. Hodgson, which appeared in the January issue of MINNESOTA MEDICINE, it was incorrectly stated that Dr. Quattlebaum had served a fellowship in obstetrics and gynecology at the Mayo Clinic. Dr. Quattlebaum took his training in surgery at the University of Minne-



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sota and at the Mayo Clinic. His associate, Dr. Jane Hodgson, completed her fellowship in obstetrics and gynecology at the Mayo Clinic in 1944 and is limiting her practice to this specialty.

* * *

Believed to be Minnesota's oldest practicing physician, Dr. George D. Haggard, Minneapolis, celebrated his ninetieth birthday on January 18.

Born in 1857 in Fairpoint, near Rochester, while Minnesota was still a territory, Dr. Haggard has served three generations of many of the state's oldest families. He graduated from the University of Minnesota Medical School in 1893 and interned at Minneapolis General Hospital. For four years he was health officer of Minneapolis. At present he is on the staff of Northwestern and Asbury hospitals. He still answers many calls, though a heart attack six months ago forced him to curtail his activities.

* * *

Dr. and Mrs. Moses Barron, Minneapolis, were guests of honor at the annual Jewish National Fund dinner, held January 26 at the Radisson Hotel. In recognition of Dr. and Mrs. Barron's twenty-five years of leadership in Minneapolis Jewish affairs, nearly 100 organizations gathered to present the couple with a book bearing the names of contributors to the development of a forest in Palestine that will be named for the Barrons.

Dr. Barron, a professor of medicine at the University of Minnesota, is a past president of the Hennepin County Medical Society, the Minnesota Society of Internal Medicine, the Minnesota Pathological Society, and the Minneapolis Academy of Medicine.

* * *

Dr. Victor Johnson, Chicago, dean of students in biology and medicine and professor of physiology at the University of Chicago, will become director of the Mayo Foundation for Medical Education and Research next fall. He will succeed Dr. Donald C. Balfour, present director, who is scheduled to retire in October, 1947.

Dr. Johnson, author of several articles and books, is a member of numerous scientific and educational organizations and is on the advisory committee of the Surgeon General, United States Public Health Service, in administration of the Federal Hospital Survey and Construction Act. To accept the Mayo appointment, he resigned as secretary of the AMA Council on Medical Education and Hospitals.

Following retirement, Dr. Balfour, who has been director of the Mayo Foundation since 1937, will serve as director emeritus and as professor of surgery emeritus in the University of Minnesota graduate school.

* * *

Five physicians comprised the medical staff of the Bemidji Clinic when it opened the doors of its new building in January. Drs. D. F. McCann, T. P. Groschupf, and D. D. Whittmore, Bemidji, were joined by Drs. W. J. Deweese and S. F. Becker to form the

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clinic group which will practice in the recently completed office building.

Dr. Deweese, a graduate of the University of Nebraska Medical School and a veteran of World War II, has completed a residency in surgery at the Kings County Hospital in New York. Dr. Becker, who graduated from the University of Minnesota Medical School before serving in the navy, was formerly a member of the Bratrud Clinic in Thief River Falls. More recently he has been doing graduate work at the University of Minnesota.

Negotiations are in progress to add other members to the clinic staff, and the founders hope to have the group completed by early summer.

HOSPITAL NEWS

Harry Rice, Afton township, was made a member of the Lakeview Hospital board at the meeting of the Washington County commissioners in January. He succeeded Lou Orr, who had previously resigned.

* * *

Named president of the St. Cloud Hospital medical staff at the annual meeting in January was Dr. F. J. Schatz. He succeeded Dr. J. N. Libert. The staff elected Dr. S. J. Raetz as vice president, and Dr. F. H. Baumgartner, secretary.

* * *

Dr. Charles A. Aling was named medical staff chairman of St. Barnabas Hospital, Minneapolis, at the annual staff meeting February 5. Dr. Elmer J. Lillehei was elected vice chairman, and Dr. William E. Proffitt became secretary-treasurer.

* * *

At the annual staff meeting of Eitel Hospital, Minneapolis, Dr. Frank R. Hirschfield was elected chief of staff to succeed Dr. William R. Jones. Dr. Ray Cochrane was chosen assistant chief of staff, and Dr. Gordon G. Bowers was elected secretary.

* * *

In Brainerd, Dr. J. A. Thabes, Sr., has been elected chief of staff of St. Joseph's Hospital, succeeding Dr. V. E. Quanstrom, Dr. R. A. Beise has been selected to place Dr. W. E. Fitzsimons as vice chief of staff, and Dr. Fitzsimons has succeeded Dr. J. A. Thabes, Jr., as secretary-treasurer.

* * *

With his re-election as president, Dr. J. E. O'Donnell heads the staff of St. Mary's Hospital, Minneapolis, for a second term. Dr. F. B. Mach is serving as vice president, and Dr. L. J. Happe is secretary-treasurer. These three men, together with Dr. Leo C. Culligan, Dr. B. A. Dvorak and Dr. L. A. Lang, form the advisory board of the hospital.

* * *

On January 10, Dr. A. J. Spang was elected chief of staff of Miller Memorial Hospital, Duluth, at the medical staff's annual meeting. Other officers named were Dr. K. R. Fawcett, vice chief of staff, and Dr. Karl Johnson, secretary-treasurer. Dr. A. L. Abraham and Dr. Miriam Fredericks were elected as new members

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of the executive committee, while Dr. Mario Fischer was named an ex-officio member.

* * *

Two New Ulm hospitals elected officers at annual staff meetings on January 9.

Heading the Loretto Hospital staff are Dr. Carl J. Fritsche, president; Dr. O. B. Fesenmaier, vice president, and Dr. O. J. Seifert, secretary.

Union Hospital officers are Dr. H. A. Vogel, president; Dr. O. J. Seifert, vice president, and Dr. Carl J. Fritsche, secretary.

* * *

Organization of a community hospital board in Blue Earth was completed in early January. John Frundt was elected president of the board, Martin Madison, vice president, and Frances Schneider, secretary-treasurer.

President at a later meeting of the board were the local doctors of Blue Earth, as well as Dr. C. D. Snyder, Kiester; Dr. A. W. Sommer, Elmore, and Dr. Lewis Hanson, Frost. The board selected Minnie Fenske as superintendent of the hospital. A medical staff was organized, with Dr. C. E. Wilson as head.

* * *

Hibbing General Hospital has selected Dr. T. A. Estrem as chief of staff, Dr. C. N. Harris as vice president, and Dr. T. R. Schweiger as secretary.

Department heads named at a staff meeting in January are Dr. L. W. Johnsrud, surgery; Dr. L. S. Nelson, internal medicine; Dr. L. W. Morsman, ophthalmology; Dr. Andrew Sinimark, otolaryngology; Dr. C. N. Harris, pediatrics; Dr. Frank Bachnik, obstetrics; Dr. A. C. Tingdale, communicable diseases and contagion; Dr. C. S. Raadquist, x-ray; and Dr. Randall Derifield, laboratory.

* * *

The position of executive administrator of Northwestern Hospital, Minneapolis, was assumed on March 1 by Russell Nye, former administrator of the Dallas, Texas, city-county hospital system.

Mr. Nye, who before his new appointment was president-elect of the Texas Hospital Association has held administrative positions at Michael Reese Hospital in Chicago, Crawford-Long Memorial Hospital in Atlanta, and the University of Iowa Hospitals. He succeeds Colonel Harry Brown, who has been on military leave, and who will return to active army duty.

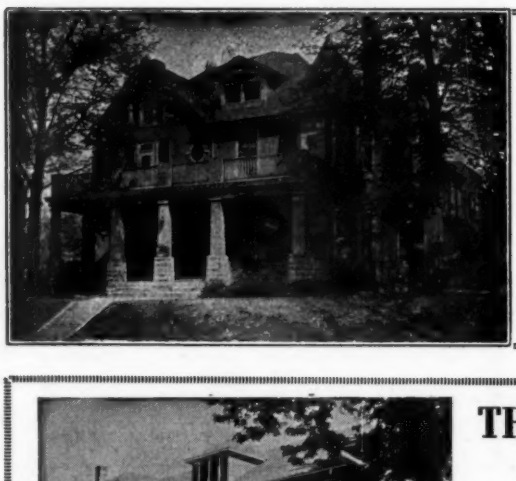
* * *

Chief of staff of St. Luke's Hospital, Duluth, for 1947 is Dr. A. O. Swenson, who was recently elected to succeed Dr. Anderson C. Hilding.

Also named by the hospital staff were Dr. Gordon C. MacRae, vice chief of staff; Dr. J. R. Manley, chief of obstetrics; Dr. Peter S. Rudie, chief of surgery; Dr. R. E. Nutting, chief of pediatrics; Dr. M. F. Fellows, chief of eye, ear, nose and throat; and Dr. A. H. Wells, chief of pathological laboratories. Dr. F. J. Hirschboeck, Dr. A. L. Abraham, and Dr. C. M. Bagley, secretary, were named to the executive committee.

* * *

Earl C. Wolf, purchasing agent of St. Mary's Hospital in Rochester, was named president of the Minnesota



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Hospital Association at a meeting of the board of directors in Minneapolis on January 18.

Former first vice president of the Association, Mr. Wolf was appointed to serve out the unexpired term of the late W. W. Sherman, who was superintendent of the Naeve Hospital in Albert Lea. His tenure will expire May 15, when the Association holds its annual meeting in Minneapolis.

Emil Hanson, superintendent of Winona General Hospital, was elected to Mr. Wolf's former office.

* * *

Election of Dr. L. R. Gowan as chief of staff of St. Mary's Hospital, Duluth, was announced on February 7. He replaces Dr. J. E. Power in the position.

Other staff officers of the hospital, elected at the same time, are Dr. C. O. Kohlbry, president-elect; Dr. F. T. Becker, secretary of the staff; Dr. R. P. Buckley, chief of pediatrics, and Dr. A. J. Bianco, chief of surgery.

Officers continuing from 1946 are Dr. Frank Cole, chief of anesthesiology; Dr. J. A. Winter, chief of eye, ear, nose and throat; Dr. C. W. Taylor, chief of contagion; Dr. E. L. Tuohy, chief of laboratories; Dr. Richard Bardon, chief of medicine; Dr. L. E. Schneider, chief of neurology; Dr. J. R. Moe, chief of obstetrics; Dr. M. H. Tibbetts, chief of orthopedics, and Dr. M. A. Nicholson, chief of urology.

MASSIVE GASTRIC HEMORRHAGE

(Continued from Page 319)

Discussion

DR. HAMLIN MATTSON: In the first section you showed, isn't that sufficient to give a diagnosis of ulcer in the mucous membrane?

DR. G. H. HALL: Yes. The pathologist called it a small acute ulcer.

DR. HAMLIN MATTSON: From what part of the stomach was that taken?

DR. G. H. HALL: The posterior upper portion of the resection.

DR. JOHN R. PAINE: I should like to ask some of the experienced surgeons what a surgeon is supposed to do if he operates for an ulcer and does not find an ulcer. Do you leave the stomach in or take it out?

DR. WILLARD WHITE: I don't pretend to be able to answer the question, but if you have a patient into whom you are pouring blood and he is pouring it back as fast as you pour it in, you have to do something, and I think that resection is exactly the thing to do. I have had to make this same decision, myself.

DR. JOHN R. PAINE: It is a pure and simple gamble. The only bad thing is that you have to take out the stomach. The ulcer may be somewhere else.

DR. J. M. HAYES: In speaking of gastric hemorrhage, we must refer back to a previous discussion before this society on the use of Koagmin. Dr. Arnold Jackson of Madison popularized this drug in this vicinity. Those who have given it a trial are usually enthusiastic about the results. I have used it several times in case of severe gastric hemorrhage and agree with Jackson that it will often check the hemorrhage sufficiently to defer an emergency operation.

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BOOK REVIEWS

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PRACTICAL PHYSIOLOGICAL CHEMISTRY. Twelfth Edition. Philip B. Hawk, Ph.D., President and Bernard L. Oser, Ph.D., Director, Food Research Laboratories, Inc., New York; and William H. Summerson, Ph.D., Associate Professor of Biochemistry, Cornell University Medical College, New York. 1323 pages. Illus. Price, $10.00, cloth. Philadelphia: The Blakiston Co., 1947.

RADIOLOGY for Medical Students. Fred Jenner Hodges, M.D., Professor and Chairman, Department of Roentgenology, University of Michigan; Isadore Lampe, M.D., Associate Professor, Department of Roentgenology, University of Michigan, and John Floyd Holt, M.D., Assistant Professor, Department of Roentgenology, University of Michigan. 424 pages. Illus. Price, $6.75, cloth. Chicago: Year Book Publishers, 1947.

THE COMPLEAT PEDIATRICIAN. Practical, Diagnostic, Therapeutic and Preventive Pediatrics. Fifth Edition. Wilbur C. Davison, M.A., D.Sc., M.D., Professor of Pediatrics, Duke University School of Medicine and Pediatrician Duke Hospital; formerly Acting Head of Department of Pediatrics, Johns Hopkins University School of Medicine, etc. Price, $3.75 check with order, or $4.00 on credit, cloth. Durham, N. C.: Duke University Press, 1946.

FUNDAMENTALS OF CLINICAL NEUROLOGY. H. Houston Merritt, M.D., Professor of Clinical Neurology, College of Physicians and Surgeons, Columbia University; Chief of Division of Neuropsychiatry, The Montefiore Hospital; Fred A. Mettler, M.D., Ph.D., Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University, and Tracy Jackson Putnam, M.D., Professor of Neurology and Neurological Surgery, College of Physicians and Surgeons, Columbia University, New York. 289 pages. Illus. Price, cloth, $6.00. Philadelphia: The Blakiston Co., 1947.

HEALTH EXAMINATIONS. A Manual for the General Practitioner. Prepared for Medical Society of the County of New York, by the Special Committee on Preventive Medicine. 144 pages, paper cover. Presented with the compliments of Mead Johnson & Company, Evansville, Indiana, 1947.

SHOCK TREATMENTS AND OTHER SOMATIC PROCEDURES IN PSYCHIATRY. L. B. Kalinowsky, M.D., Research Associate in Psychiatry, College of Physicians and Surgeons Columbia University, and New York State Psychiatric Institute and Hospital, Assistant Neurologist, Neurological Institute of New York; and Paul H. Hoch, M.D., Assistant Clinical Psychiatrist, New York State Psychiatric Institute and Hospital; Instructor in Psychiatry, College of Physicians and Surgeons, Columbia University. 320 pages. Price $4.50. New York: Grune & Stratton, Inc., 1946.

This is a very well-organized, authoritative, easy-to-read treatise on, primarily, shock treatment but it deals also with other somatic non-surgical treatment, prefrontal lobotomy, and theoretical considerations in relation to this phase of psychiatric therapy.

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INDEX TO ADVERTISERS

Abbott Laboratories 230
American Meat Institute 232
American National Bank 343
Ames Co., Inc. 330
Anderson, C. F., Co., Inc. 239
Ayerst, McKenna & Harrison, Ltd. 255

Benson, N. P., Optical Co. 333
Birches Sanitarium, Inc. 342
Borden's Prescription Products Division 243
Borcherdt Malt Extract Co. 336
Bristol Laboratories, Inc. 245
Brown & Day, Inc. 333
Burroughs Wellcome & Co. 233, 254

Camel Cigarettes 247
Camp, S. H., & Co. 236
Ciba Pharmaceutical Products, Inc. ..... Facing page 240
Classified Advertising 342
Cleartone Hearing Aid 334
Cook County Graduate School of Medicine 339

Dahl, Joseph E., Co. 343
Danielson Medical Arts Pharmacy 340
Druggists Mutual Insurance Co. 343

Ewald Bros. ..... Inside Back Cover

Franklin Hospital 342

General Electric X-Ray Corporation 235
Glenwood Hills Hospitals 249
Glenwood-Inglewood Co. 341
Griggs, Cooper & Co. 335

Hall & Anderson 343
Holland-Rantos Co., Inc. 240
Homewood Hospital 336
Human Serum Laboratory 334
Hynson, Westcott & Dunning 332

Kalman & Co., Inc. 337
Kinney, H. W., & Sons, Inc. 241
Kroll, August F. 343

Laboratory Ramsey County Medical Society 246
Lilly, Eli, & Co. ..... Facing page 256

McGowans 323
Maico Co. 328
Massachusetts Indemnity Insurance Co. 226
Mead Johnson & Co. 344
Medical Placement Registry 342
Medical Protective Co. 234
Merck & Co., Inc. 250
Milwaukee Sanitarium ..... Back Cover
Mithun X-Ray Co. 339
Mounds Park Sanitarium ..... Back Cover
Murphy Laboratories 343

Nestle's Milk Products 253
North Shore Health Resort 333

Palm Orthopedic Appliance Co. 340
Parke, Davis & Co. ..... Inside Front Cover, 225, 325
Philip Morris & Co. Ltd. Inc. 244
Physicians Casualty Association 337
Physicians & Hospitals Supply Co. Inc. 231, 340, 343
Pogue, Mary E., School 326

Rest Hospital 338
Rexall Drug Co. 238
Roddy-Kuhl-Ackerman 340

St. Croixdale Sanitarium 228
Schenley Laboratories, Inc. 248
Schering Corporation 237
Schmid, Julius, Inc. 252
Schusler, J. T., Co. 342
Searle, G. D., & Co. 321
Seelert Orthopedic Appliance Co. 341
Smith-Dorsey Co. 324
Smith, Kline & French Laboratories 251, 329
Squibb, E. R., & Sons 229

Upjohn Co. 331

Vocational Hospital 338

Walker Vitamin Products, Inc. 256
Williams, Arthur F. 343
Winthrop Chemical Co. Inc. 327
Wyeth, Inc. 242

Zemmer Co. 342

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